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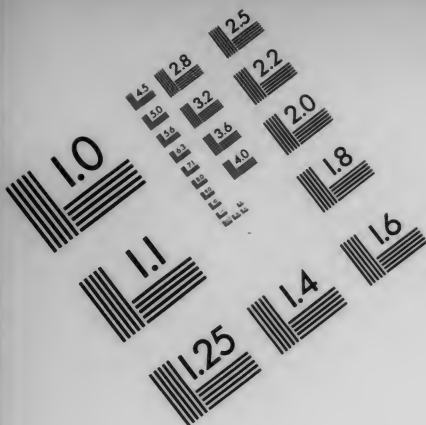
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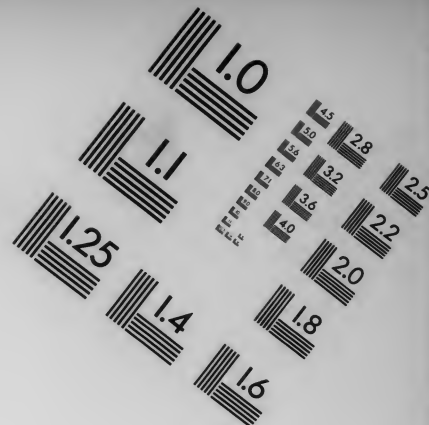
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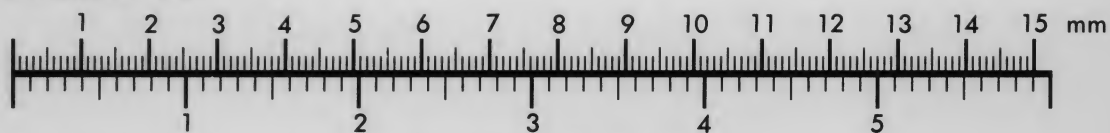
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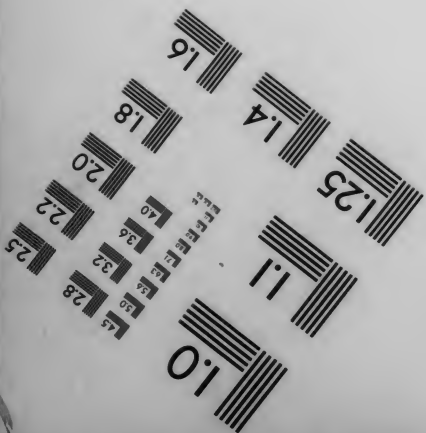
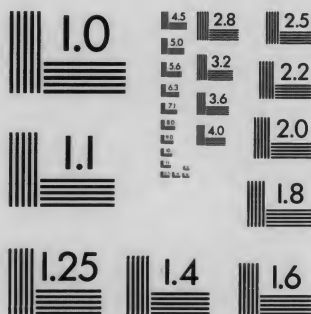
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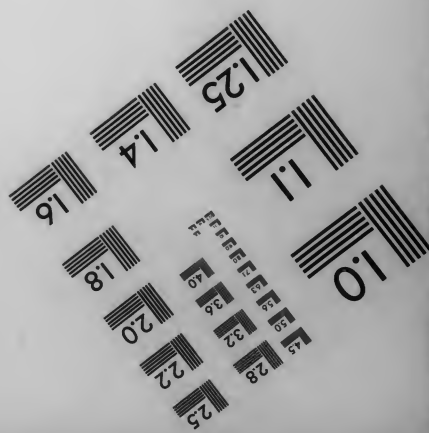
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THE EARTH AND THE WORLD

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The Earth and the World—How Formed ?

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The Earth and the World How Formed?

A Layman's Contribution to the
Religious Thought of the Times

BY

ABRAHAM G. JENNINGS



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Preface

THE examination of the prevalent theories relating to the formation of our solar system in particular, and other systems in general, may seem, to many persons, to be a matter of no practical importance, and hardly deserving of one's time and consideration. This would be true were it merely a matter of some speculative theory, in which no principle of truth was involved, nor the peace and welfare of any mortal being thereby endangered.

The question, however, is one of more than ordinary interest. Its importance is supreme, as it involves the truth of the Scriptures, which affirm that God is the Creator of the Heavens and the Earth. This God Himself distinctly claims in His Word, which records, also, definite statements concerning the creation of the world that are either inconsistent with, or directly opposed to, the "Nebular Hypothesis."

In the creation or formation of the Heavenly bodies, the "Nebular Hypothesis," in its conception, operates independently of any Creator. It does not require any divine architect to design, create, establish and uphold the world and the universe, as we know it to exist. It discards

God altogether, or removes Him so far away, that His handiwork is not seen, known, or acknowledged.

These are some of the reasons that have decided the writer to publish the result of his examination of this subject matter, and his convictions concerning it, and what he believes to be some of the facts relating to the creation of the world, in the hope it may lead abler writers to examine the subject thoroughly, that all the great facts relating to God's creation may be learned, and finally be made known for the good of mankind.

A. G. J.

BROOKLYN, N. Y., *February, 1900.*

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The Earth and the World—How Formed?

I

THE NEBULAR HYPOTHESIS

1. *The Hypothesis Examined.*—In our attempt to disprove the "Nebular Hypothesis" of the formation of our solar system, we could support our position by presenting many proofs drawn from the Scriptures of the Old and New Testaments, which would be accepted by millions of intelligent men and women, as contradicting that hypothesis; yet we do not intend to offer any such evidence, being well aware that it would not be accepted by most scientists, as well as by many others, as furnishing sufficient proof of the truth of any statements thus made. We shall therefore aim to maintain our assertion of the baseless fabric of the "Nebular Hypothesis" by reasonable evidences, resting on their own intrinsic truth and merits, independent of what may be termed the "revealed truth of the Scriptures."

2. *Laplace's "Nebular Hypothesis" Described.*—The question before us is, what is the prevailing theory now held and taught by scientists, and accepted by many intelligent minds, including religious teachers, as facts relating to

the creation or formation of our solar system in general, and our world in particular? In reply, we state that the "Nebular Hypothesis" of the formation of our solar system,—the sun, together with all the planets and celestial bodies belonging to it—is the favorite theory; and it appears to be the only one accepted or advanced by the scientific and literary world, as being true.

Laplace, a celebrated astronomer and mathematician, has the credit of being the father of, or at least, the principal defender of, this Hypothesis. A publication used in one of our leading colleges, states Laplace's Hypothesis thus:—

"He supposed that in ages past, the matter now forming the sun and planets, was in the form of a nebula. That the nebula was a cloud of intensely heated gas. That, under the action of its own gravitation, it assumed a globular form, with a rotation around an axis. That hence, the mass flattened at the poles, and, because of centrifugal force, rings of nebulous matter would be abandoned at the equator, like the rings of Saturn. That, in time, this ring would break, and the matter collect into a single globe. That this planet would revolve, and in turn, abandon rings which would, in turn, break. That by the condensation of matter by force of gravity, and by the great velocity of this revolving body and friction of its materials, great heat and light would be generated, producing a consuming fire, which would continue until the revolving body was consumed, or became a burned out

cinder." This is a brief but plain statement of the "Nebular Hypothesis."

There has been published in France, within a few years, a work on astronomy, under the title of "Popular Astronomy," edited by Camille Flammarion, an astronomer of high repute. The work has not only met the approval of the French savants, but also that of the French Government, who have had the book placed in their schools as a standard work.

The work has been translated into English by J. Ellard Gore, F. R. A. S., etc., who is himself an author of astronomical works. It has been republished in the United States by D. Appleton & Co. As the book gives the prevailing and popular theory of the formation of the solar system, as mapped out by Laplace, we shall quote from it as a fair exponent of the prevailing ideas now taught.

We quote, then, from that book ("Popular Astronomy") as follows: "Well, the most probable hypothesis, the most scientific theory, is that which represents the sun as a condensed nebula. This carries us back to an unknown epoch, when this nebula occupied the present place of the solar system, and even more; an immense lens-shaped mass of gas turning slowly on itself, and having its exterior circumference in the zone which makes the orbit of Neptune, or further still, for Neptune does not form the true limit of the system. Let us imagine then, an immense gaseous mass placed in space. Attraction is a force inherent in every atom of matter. The denser por-

tion of this mass will insensibly attract toward it the other parts, and in the slow fall of the more distant molecules toward this more attractive region, a general motion is produced, incompletely directed toward this centre, and soon involving the whole mass in the same motion of rotation."

To continue:—"The laws of mechanics show that, as this gaseous mass condenses and shrinks, the motion of the rotation of the nebula is accelerated. In turning, it becomes flattened at the poles, and gradually takes the form of an immense lens-shaped mass of gas. It has begun to turn so quickly as to develop, at the exterior circumference, a centrifugal force superior to the general attraction of the mass, as when we whirl a sling; the inevitable consequence of this excess is a rupture of the equilibrium, which detaches an external ring. This gaseous ring will continue to rotate in the same time and with the same velocity; but the nebulous mother will be henceforth detached, and will continue to undergo progressive condensation and acceleration of motion. The same feat will be reproduced as often as the velocity of rotation surpasses that by which the centrifugal force remains inferior to the attraction. It may have happened also, that secondary centres of condensation would be formed even in the interior of the nebula."

Continuing the quotation from "Popular Astronomy": The most distant known planet, Neptune, would be detached from the nebula at the epoch when this nebula extended as far as

the planet, out to nearly 3,000,000,000 of miles; and would turn in a slow revolution, requiring a period of 165 years for its accomplishment.

"The original ring could not remain in the state of a ring unless it was perfectly homogeneous and regular; it is, so to say, unrealizable, and it did not delay in condensing itself into a sphere. Successively, Uranus, Saturn, Jupiter, Mars, and the army of small planets, would thus be detached or found in the interior of this same nebula. Afterward came the earth, of which the birth goes back to the epoch when the sun had arrived at the earth's present position. Venus and Mercury would be born later. Will the sun give birth to a new world? This is not probable. For this purpose, it would be necessary that its rotation should be enormously accelerated: it should be 219 times more rapid. That is, the sun would have to rotate on its axis in three hours, instead of in twenty-five days."

The Rev. Dr. Campbell, in his "Story of the Creation," writes (page 40) that "Laplace wrought out a theory known as the 'Nebular Hypothesis,' and according to this story, all the planets, asteroids, satellites, suns, and moons of the great group to which we belong, and which is best observed in the 'Milky Way,' once constituted such a nebula as we sometimes see in the far-off sky."

The doctrine is, then, that all these stars and systems once existed as a thin, impalpable haze, filling all the immense spaces now intervening;

that somehow this nebula was set whirling; that in process of whirling, it broke up into fragments, and that these fragments, still whirling, still further condensed, and eventually consolidated into the world and systems which we now behold.

It is admitted by astronomers that the nebula now visible in the heavens does not belong to our solar system: that it is as far off as the nearest fixed star, and even further; that the distance to the nearest star has not been satisfactorily determined, and, at the best, can only be approximately guessed at, for it is stated as a fact, "that among all the stars in the sky, there is not one which shows a parallax of one second, that is, annual motion of two seconds, which is sufficient as a basis for calculation of its distance." This being so, we cannot speculate with any certainty regarding the nature or character of the nebula visible in the far-off heavens.

3. *Evidence Which its Inventor or Defenders Should Produce.*—To go from declared effect up to cause, it belongs to the inventor of the hypothesis to show probable cause, or origin of this tremendous gaseous mass; and how it was accumulated in one complete body. This information, neither the inventor nor its advocates have given. Nor have they stated the simple elements incorporated in this wonderful body. If this nebula, as claimed, was the parent of the sun, and of all the planets, satellites, and other bodies belonging to our solar system, then, at its beginning, it must

have contained in itself all the simple elements known, as well as those that are unknown, that exist in all the bodies forming our solar system. If all the elements were not in the nebula at the beginning, how were they afterward added to or gotten into it, so as to form important component parts of the body? Think of all the known elements in our earth, to say nothing of the sun, and other celestial bodies. Where did they come from, and how were they produced? Was there any process by which they were spontaneously generated in the nebula itself? If all the simple elements found in our earth, or known to be in our solar system, were in the nebulous mass at the beginning, in what condition did they exist? Was each element separate and distinct from all other elements, or were they all mixed indiscriminately, a regular conglomeration of all things in the universe?

It is understood as being accepted by the inventor, that this immense nebula forming our solar system, was, at the beginning, previous to its giving birth to the first planet, in a state of rest. And the theory also is, that motion was given to the mass, by the condensation of its gases, and the attraction of its molecules toward the centre, which would tend, as claimed, to give the vast body a rotary motion; and also, that this internal circulatory movement of the molecules would, in consequence of the friction, produce heat; and, the more rapid the movement of the gaseous particles, the faster would the great

nebula turn on its centre, until its centrifugal force was greater than its centripetal force. At this period, and in that case, this immense body would commence to throw off from its surface, particles of gaseous matter, which, according to the theory, would collect together, and form a ring around the parent body of gaseous material; and the new ring thus formed, would have the same motions as the main body from which it was thrown, and revolve about it in the same period of time.

It was expected that, in due time, this ring would, and, in fact, did, according to the theory, break up, and get together again in a compact body, one great globe; which, it is claimed, was actually the case with the planet Neptune, the one farthest from the sun, the firstborn in our system, though the last that has been discovered.

4. *Immensity of the Nebula When the Star Neptune was Born.*—It is claimed by the inventor of the hypothesis that this nebula, the mother of our solar system, must necessarily have been in its diameter and circumference, at least equal to the orbit of the planet farthest from the sun, which is now known to be Neptune. As the distance of that planet from the sun has been ascertained to be 2,750,000,000 miles, therefore it follows that the circumference of this vast nebula would be about 16,500,000,000 miles, which dimension is far beyond the comprehension of mortal man.

From the records of facts in astronomy, we

learn that the planet Neptune completes its orbit about the sun in 165 years. Now this nebula, according to the theory, turns on its own centre in the same time, that is, once in 165 years; in the doing of which, its equatorial circumference passes through space at the rate of over 11,000 miles per hour.

One important, in fact, necessary, part of the hypothesis is, that there is a ring formed from the material of the nebula which is thrown off from its circumference by the rapid revolution of the great body. This ring is, in some way, eventually collected together and formed into a solid globe, like our earth, and the other planets of our system. It may be well to consider here the inherent or material composition of the great nebula, claimed to be the parent of our solar system. If it was of a gaseous nature, and mainly of hydrogen gas, as affirmed, we would remark that it is the nature of all the gases to expand, and not to contract; to resist pressure, condensation and liquifaction, even under tremendous pressure. Hydrogen gas, when confined in the balloon, bursts the strong canvas, when outside pressure is withdrawn. The gases forming the nebula are supposed to possess the same nature and characteristics they are known to possess on this earth. It is not their nature to condense, like steam of water; especially if they are in a heated condition, as they are said to have been. It is true that while some of the gases have affinity for others, and under certain conditions and

proportions, form combinations with each other, others repel and refuse union with any. The gases, as a rule, all resist pressure. No force of gravity can compel those light, volatile, elastic materials to contract, condense, and settle down to the centre of the great mass, unless there is an intense degree of cold; and that is opposed to the hypothesis. Rather, on the contrary, it would seem that a strong covering like an immense rubber-bag would be required, to keep the gaseous elements from expanding and spreading over the universe.

Besides, in the various combinations of these different elements many dangerous explosive compounds would necessarily be formed; and the great nebula, being without any controlling head, or intelligent governing power, would be subject to many a destructive catastrophe. Some combinations of the gases or elements on a large scale would scatter the nebula in all directions, and might even shake the universe.

As the movements of the great nebula, internal as well as external, depend on chance, and are not results of wise design, some such accident as named would be sure to have happened long before it was time for our earth to be born. Especially would this be likely to occur, as a consuming fire was one of the elements that, according to the theory, would prevail in the interior of the mass.

5. *Formation of the So-called Rings Improbable.*—It is well known that a fast revolving

body will throw off from its surface, anything that is loose or unsecured to it,—as water from a wheel, or sparks from a fire-wheel; but when thrown off or parted with, by the revolving body, they cannot be gathered together again unless there is some substantial outer circle that will stop the flying particles in their progress, and collect the same. So this parent nebula, in its rapid motion on its axis, is supposed to throw off its gaseous material to form a planet, or burning star. How is the so-called ring, that is finally to resolve into a solid globe like the planets, to be formed? What is there to prevent the material which is thrown off from the main body from flying off in all directions into unlimited space? The centrifugal force that was sufficient to throw the particles of matter from the main body would certainly impel these atoms to move forward into a vacuum, which could present no resistance to their continued progress. Therefore, according to natural law, it would be impossible to form the nebulous rings, as affirmed.

According to the law of force of gravity, it seems that the particles of matter thrown off from the main body, ought, as soon as they had lost the impetus given them by the rotating body, to have returned to it, as a cannon ball returns to the earth after having been shot from the cannon; or as the eruptive material of the volcano, thrown high into the air, falls again to the earth's surface.

Was it the understanding of the inventor of

the hypothesis that there was a sort of general or natural assent of all the particles thrown off from the revolving body, to proceed from it only certain millions of miles, and then stop, and wait for a further accession to their ranks from the parent body before attempting any other procedure?

6. *How was a Rotary Motion Given to the Great Nebula?*—The question is, how was motion given to it, or how did it get started on its career? Remember it was 5,500,000,000 miles in diameter; 16,500,000,000, in circumference; of gaseous material, highly attenuated, as affirmed; for stars can be seen through the nebulae in the heavens. How did this immense body get started? It could not start itself, for matter lies inert. Its internal motion, if it had any, was as likely to move it in one direction as another. It is not to be supposed that, in the unlimited space, there would be any breezes that would blow it over.

One author, who wrote a book on astronomy, (name not remembered) and who favored the "Nebular Hypothesis," held that the most difficult thing to account for, was, how motion was given to the great nebula. Well he might; for it is a mystery how it was started. The great gaseous body, not having any tangible point, must have been too thin for even the angels to turn over, even if they had long levers and a substantial fulcrum on which to work them. If the innumerable host had all got on one side,

that would not have turned it over, for being spiritual beings, they are supposed to be without weight.

Besides the external motion of the nebula, on its own centre, it is claimed, and it is a part of the theory of the inventor of the hypothesis, that there is an internal motion of its molecules or particles of matter, which forms an important and necessary link in proof of the hypothesis. That by the force of gravity, inherent in every atom of matter, the molecules of the great body would be attracted toward the centre, and this would cause an internal and ever-increasing circulation, as well as direct motion of the molecules or atoms, the constant friction of which, with each other, would create heat,—an increasing degree of heat,—until there was a flame, a consuming fire, a burning star or sun, as all the planets were once, as affirmed by the defenders of the hypothesis.

Now supposing there was such a nebula, the mother of planets, we do not perceive under what rule there would, or could, be any such motion of its atoms as claimed—a movement of the atoms circulating among each other like a swarm of flies, causing friction, heat, etc.

If the molecules were subject to the force of gravitation, they would gradually sink toward the centre, as fine sand, when scattered on the water, would sink to the bottom. If the nebula was in any way similar to a large vat of new beer, where all the elements were vigorously

working to change their identity, we might say, there was cause for internal commotion.

The rotation of the nebula on its axis is given as a reason why there would be an internal movement of its particles in respect to each other. Our earth, in its daily revolution, moves at the equator, 1,000 miles per hour, yet no one perceives it, for all things move harmoniously with it. The air, water, and all things are quiet in respect to each other, and are in no way disturbed by the rapid rotation of the earth; and this would be the natural rule that would govern the nebula.

7. *How did the Great Ring of Matter first Thrown off, get Free from its Nebula?*—There is another difficulty connected with this great ring or belt formed about the main body, that is too important to be passed over without being explained; and that is, how did this immense ring of matter finally get separated and become entirely disconnected from the parent body? It will be remembered that this body was over 5,000,000,000 miles in diameter, and the ring thrown off, therefore, would be 16,000,000,000 miles in circumference, more than 1,000,000,000 miles wide; depth or thickness not estimated.

Now for the ring to let out, or get rid of, the parent body, it would have to make an opening at least 5,000,000,000 miles for the parent body to squeeze through; but during the process of such an operation, the ring would certainly lose its bearings, be attracted beyond its power to re-

sist, and again join the parent body; unless, on account of the exigency of the situation, the law of gravitation should be suspended for the time being.

If the ring should separate and go into many pieces, as has been suggested, the question then would be, how would they get together again and form one homogeneous body? The great parent nebulous body, complete in itself, would have a thousand times more power to attract the pieces of the ring again to itself, than the fragments of the ring scattered 1,000,000,000 miles apart would have to get together and form one compact body.

It has been suggested that the great nebulous ring might rise up, or drop down 5,000,000,000 miles, and thus let out the parent body. But the objection to that proceeding is, it would throw either the ring or the main body 1,000,000,000 miles out of the plane of the orbit of all the planets, including the planet Neptune. This would be contrary to the astronomical laws known to govern our system.

We confess we are unable to solve the dilemma. But there is the planet Neptune in the heavens, where it has been shining on for ages; and the evolutionists can point to it in confidence, as an indubitable fact that speaks for itself, that the planet ring was finally extricated from all its difficulties, and became the solid globe and star it is known to be; but how all this was accomplished are matters apparently of no consequence to them.

II

THE NEBULAR HYPOTHESIS AND THE PLANETS

8. *The Mystery Concerning Uranus.*—After the birth of Neptune, the nebulous mass seems to have shrunk in all directions, and at the same time, its rotation on its axis, according to the theory, was greatly increased. After another age had passed, how long no one can tell or surmise, the nebula had thrown off a great mass of its material substance, which was duly formed into another ring about the nebulous body; and this new ring, in due time, and in some manner not known, was resolved into a separate burning star, and finally cooled down and became the solid globe now known as the planet Uranus, the second star born into our solar system, as far as is known.

This planet, Uranus, according to astronomical records, is 1,782,000,000 miles distant from the sun, which is about 1,000,000,000 miles less than the planet Neptune.

One naturally asks, why did the great nebula delay so long before forming another ring, more than ten times the distance of our earth from the sun? Did it rotate faster or slower? Did it grow hotter or colder? Its shrinkage in its diameter was at least 2,000,000,000 miles, and, for that great shrinkage, it ought to have thrown off a vast amount of its gaseous materials. What

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has become of it? Astronomers and observers of the heavens, aided by the best instruments man has been able to produce, after careful search, are unable to find in the heavens, in the 1,000,000,000 miles between Uranus and Neptune, any other body.

9. *Delivery of the Planet Saturn. Riddles to be Solved.*—The next star or planet our nebula has the credit of adding or introducing into our solar system, is the unique and well-known planet Saturn. This planet was known to the ancients, while Uranus and Neptune were not. Saturn is some 900,000,000 miles nearer the sun than Uranus, and the same inquiries arise as were made in reference to Uranus; namely, why did the parent nebula delay so long, and why permit 900,000,000 miles of space to intervene before forming another ring, that was to be resolved into a burning star and, in due time, a planet world. Will the defenders of the "Nebular Hypothesis" please explain? Saturn is the wonder of our solar system; it is unlike any of the other bodies in it, and so far as is known, any in the universe.

Saturn is larger than Neptune and Uranus joined together, though its density is much less. Its specific gravity being the least of any one of the bodies belonging to our solar system. Its gravity is eight times less than our earth, and less than three-fourths that of water.

The lack of density in this planet is a very singular element, if it was evolved from the same

nebula supposed to be the parent of all the other bodies in our solar system. According to the law of force that rules in revolving bodies, the heaviest parts of the material, if at liberty to change position, gravitate toward the outer edge of the revolving body. Therefore this nebula ought to have thrown off its heaviest material first, and not last, as in the case of the planet Mercury, which, in specific gravity, is sixteen times heavier than Saturn; for Mercury, according to astronomical records, is as "heavy as lead." Of all the bodies in our solar system no two agree in density, and all differ in very many particulars, which is both surprising and difficult to account for, if, according to this theory, they were all evolved from the same material body. We should no more expect this than we would expect that, from the same fountain, would issue forth, both sweet and bitter waters. Our nebula, not being under the control of any governing power, is certainly very erratic in its movements.

The peculiar distinction of the planet Saturn, which gives it an eminence above all other bodies in the heavens, is the great rings, separate and distinct, that surround the main body and give to it its unique and peculiar appearance. We do not know whether the defenders of the "Nebular Hypothesis" ever attempted to show how such a peculiar body could be formed by their theory. We cannot conceive, ourselves, how it might be accomplished. Yet the planet Saturn seems to be in fault, innocently however,

for suggesting to the inventor of the hypothesis, the idea of great rings forming the bodies in the solar system. Aside from the "Nebular Hypothesis," no one on the earth knows for what use or purpose the Almighty designed and created that particular planet. Evidently no such work is done on it as man performs on this globe of ours. It is a sort of central body, about half way between the boundaries of the system and the sun. It may be a rendezvous for the angels: an "angelic observatory" for the use of the angels in charge of our solar system.

10. *Next Great Jupiter Thrown Off. Facts Relating to Jupiter Disprove the Existence of the Nebula.*—The next body in our solar system after Saturn, is the planet Jupiter, which according to the hypothesis, is the fourth one thrown off by the great nebula in the form of a ring of nebulous matter, and which afterward gathered itself together, in some way, and made the glorious Jupiter, the prince of planets, the pride of our solar system.

The diameter of Jupiter is 88,000 miles, and, in mass, it is larger than all the other planets and satellites put together; while, in many respects, is unlike any one of them. Jupiter is distant from Saturn only about 400,000,000 miles, while the preceding planets were separated in space 1,000,000,000 miles from each other. What is surprising in the matter is, that the great nebula should, in the space of 400,000,000 miles deliver itself of a body much larger than the three pre-

ceding planets massed together, in the formation of which, the nebula had decreased about 4,000,000,000 miles. It is impossible to account for these contradictory results.

The density of Jupiter, while it is greater than that of Saturn, is only one-fourth that of our earth. The inclination of its equator toward its orbit is less than that of any of the other planets; in fact, it is so small that it has no summer nor winter, nor any of the seasons that we experience. The rotation of Jupiter on its axis is very rapid, rotating once in less than ten hours. While our earth, at the equator, passes through space at the rate of 1,000 miles per hour, and the sun, at its equator, about 4,300 miles per hour, the planet Jupiter, at its equator, moves with a velocity of 27,000 miles per hour; while the same planet, in revolving about the sun, passes through space only about 22,000 miles per hour.

How are we to account for, or reconcile, all these dissimilar and contradictory results in every direction, of all the bodies in our system, if they all proceeded from one mother nebula? Is not the inference as plain as day, that all the bodies in our solar system were separately designed, formed, or created, and that to each was given its own distinctive characteristics and movements, independent of all others. If the great nebulous body, at the beginning of our solar system, while turning on its axis once in 165 years, as affirmed, and moving at its circumference, at the rate of 11,000 miles per hour, was able to throw off the

ring that finally, in some way, formed the planet Neptune, then why ought not Jupiter, going at its circumference, at the rate of 27,000 miles per hour, or nearly two and a half times as fast, to be throwing off material at a rapid rate? Especially ought that planet to do it, if done in the first instance; for the force of gravity on Jupiter would be less than it was on the nebulous body before it had parted with any of its planet-building material.

The polar diameter of a number of the planets is less than their equatorial diameter. They are what is called "flattened at the poles." In this respect, Jupiter is more marked than any of the other planets. The inventor and advocates of the "Nebular Hypothesis" confidently claim this feature as a sure evidence of the truth of their theory. We hold that this item or feature, relative to some of the bodies in our solar system, is the result of careful design on the part of the Creator, to accomplish a certain purpose, which truth, later on, we expect to establish to the satisfaction of all reasonable minds.

The great nebulous body that, at the beginning of its career, was about 5,600,000,000 miles in diameter, was reduced to about 960,000,000 miles after the deliverance of Jupiter.

11. *Mars Born. So Small. What is the Matter?*—The next planet to be born, or thrown off from this nebulous mass, either in a body by itself, or in the form of a ring,—for the Hypothesis allows either,—was the planet Mars, the smallest

in the system except Mercury. Mars is about 340,000,000 miles nearer the centre of the body, —our now existing sun—than is the planet Jupiter. Every one must notice the vast difference in the size of the two planets; Jupiter, immensely large, Mars, exceedingly small. What could have been the matter with the great nebula? Was it completely exhausted after the deliverance of the mighty Jupiter?

The density of Mars is three times greater than that of Jupiter, and so far as any of its characteristics are known, it does not appear to have a single element agreeing with the great planet. Between Mars and Jupiter there are a great many small bodies, now estimated at several hundred in number, revolving about the sun, called the Asteroids, and which, according to the theory of some astronomers, were once united in one body, from which they were disrupted, and the several parts scattered as they are now known to be. If the whole number were united in one mass, it would hardly equal Mars in size. According to the theory, these asteroids, or small remnants of a planet, must be considered as having been thrown off from the nebula, either as one body, or separately, and at different periods, as they were found to be in the heavens.

12. *The Earth Thrown Off. Special Examination Deferred.*—The planet next after Mars, to be introduced into our solar system by the great nebula, according to the Hypothesis, was our own Earth, concerning which we know a vast

deal more than we do of any of the other heavenly bodies. Of the elements above our heads, and beneath our feet, that go to make up this world of ours, we have particular and positive knowledge; and in this respect we are favored over the other bodies in our system.

Our earth is distant about 92,000,000 miles from the sun, being about 50,000,000 miles nearer to it than the orbit of Mars. Between us and the sun, are the planets Venus and Mercury, the former about 25,000,000, and the latter about 56,000,000 miles distant from us in their orbits. Our earth is about 8,000 miles in diameter, rotates on its axis in twenty-four hours, and revolves about the sun in 365 days. The density, or specific gravity of our earth is greater than that of any other body in our system, except the planet Mercury.

In examining the "Nebular Hypothesis," together with the conditions known to exist in our earth, and testing the truth of the theory by the facts of the case, there is much to be considered. We will therefore leave, for the present, the further consideration of the earth's conditions, and proceed to note the conditions of the remaining bodies belonging to our solar system.

13. *After the Earth, Venus.*—The next body to which the great nebula gave birth, and which followed the earth in its introduction into our system, was the planet Venus, so well known by all observers of the skies as the beautiful morning and evening star. Venus is a little less in

density than our earth, revolving about the sun in 225 days, and rotating on its axis in a little less than twenty-four hours, as now seems to be ascertained. Some competent observers have of late, declared that Venus does not rotate at all on its axis, but always presents the same side to the sun. The inclination of its equator to its orbit has not been determined.

14. *Mercury, the Last and Smallest of the Planets Born. Its Specific Gravity the Greatest when it Ought to be the Least.*—The next and last planet to be delivered to the solar system by the great nebula, was the smallest of all the known planets, Mercury. It is only about 3,000 miles in diameter, but its density is more than twice that of any of the other bodies in our system. It is heavier than lead. Who knows but that gold may be one of its principal ingredients, and that it may be the "golden planet." Just as gold is hard to get or find, so it is difficult for observers to find the planet Mercury in the heavens.

According to the law of motion in rotating bodies, if the rapidity of the revolution is sufficient to overcome the gravity of the material, the heaviest materials will move toward the outer circumference, and then, by the power of centrifugal force, be thrown off from it; just the same as when a large, strong and heavy fly-wheel, revolving rapidly, bursts or breaks, and sends the pieces of its rim flying and crashing through the building. Now, Mercury ought to have been delivered by the great nebula ages before our

earth was born. Perhaps the advocates of the "Nebular Hypothesis" can explain why the law governing centrifugal force was then inoperative, and furnish certain other particulars that seem inexplicable.

15. *Last of All the Sun. Its Great Contraction from 70,000,000 Miles Diameter to Less than 900,000.*—After the birth of the planet Mercury, the great body of nebulous matter supposed then to be 70,000,000 miles in diameter, and over 200,000,000 miles in circumference, rotating on its axis at a rapid rate, all aglow with fire, did not, as far as it has been ascertained, ever throw off another body, but began to condense in every direction, until it shrank to the present size of our sun, its diameter being about 860,000 miles, which is much less than one-hundred-and-twentieth part of the size of the nebula after Mercury was born.

Professor Flammarion, author of the "Popular Astronomy," (page 72), writes, "Well, the most probable hypothesis, the most scientific theory, is that which represents the sun as a condensed nebula." After so great a condensation of the material of the great nebula, we would naturally expect the sun, a body of 860,000 miles in diameter, having been reduced from 70,000,000 miles in diameter to less than 1,000,000, to be very dense; and that its specific gravity would be greater than that of any of the other bodies in our system. But how is it? So far from having great density, it has less than any of the bodies

in the system. Its specific gravity, as recorded, is only one-fourth that of water. It is only one-fiftieth that of Mercury, the last planet thrown off by the nebula. Will the defenders of the "Nebular Hypothesis" explain why these things are so, or account for facts so contrary and inconsistent with their theory?

Another item relating to the sun, is its comparatively slow rotary movement; while, according to the theory, it ought to go very fast. At its equatorial diameter, it moves through space about 4,000 miles per hour, while Jupiter and Saturn move about 25,000 miles per hour. In their orbits about the sun, all the planets move much faster; Mercury, the last planet thrown off, passes through space about 2,500,000 miles per day, or 100,000 miles per hour, twenty-five times faster than the sun.

The inventor of the Hypothesis has claimed all along that the flattening at the poles of most of the bodies in the solar system, or the fact that the polar diameter was less than the equatorial diameter, was one evidence of the truth of the theory. Now we do not think they can truthfully deny that if there is any one body in the solar system that ought, according to the Hypothesis, to have its poles greatly flattened, that body must be the sun. But here their theory utterly fails them. The equatorial and polar diameters of the sun are equal. It is the most perfect globe in the system. As is well known, the poles of our earth are flattened. When we examine the

matter further, we expect to be able to show that there was an accurate design to meet a positive necessity for, or rather, a great and good purpose to be served by, this flattening of the poles of the earth.

Our sun, the centre and glory of our solar system, the light and life of all the heavenly bodies composing it, "the bright orb of day," is the source of innumerable blessings to the earth and all that live on it, and, doubtless, to all the planets in our system, for without it, all would be enveloped in deep darkness and in cold, icy death.

The sun dispenses to our earth, and to all the bodies in our system, all needed light, heat, the invigorating powers of electricity and magnetism, and other benign influences not yet fully ascertained; besides imparting motion to, and controlling the movements of, all the heavenly bodies with which we are acquainted.

In the sun, that celestial globe, are manifested, in a thousand ways, infinite power, wise design, and goodness beyond expression; and the idea that that great and glorious body, which has been shining in the heavens for ages, is only the tail end of an incongruous, haphazard nebula, is preposterous and absurd beyond degree.

16. *Lord Salisbury's Statement of Facts Discrediting the "Nebular Hypothesis."*—As an outside support of our argument, we quote the following statement taken from an English paper, which is worthy of attention. At the sixty-fourth annual meeting of the British Association for the

advancement of science, the President, Lord Salisbury, also Chancellor of the University of Oxford, made the opening address. Quoting from one of the London daily papers: "Lord Salisbury, among other items, said, 'Conspicuous among the scientific enigmas which still defy solution, is that regarding the nature and origin of the chemical elements. Of these, sixty-five are known to us, but only one-third of them seem needed to form the substance of this planet. Another third are useful, but somewhat rare; while the remaining third are curiosities. Upon what law or principle this seeming random collection of dissimilar materials was brought together, the chemist is as yet unable to reply.'"

"Attention was directed to the fact that nitrogen and oxygen are absent from the spectrum of the sun, although these two elements constitute the largest portion of the solid, liquid and aerial components of the earth. Bearing this in mind, Lord Salisbury propounded to physicists, the following conundrum: If the earth is a detached bit, whirled off the mass of the sun, how comes it that, in leaving him, we cleaned him out so completely of his nitrogen and oxygen that not a trace of these gases remains to be discovered, even by the sensitive vision of the spectroscope? Other riddles were touched upon by the President of the British Association."

The facts here stated by Lord Salisbury are alone sufficient to prove the "Nebular Hypothesis" to be but "a dream of a whirling brain."

III

THE NEBULAR HYPOTHESIS AND THE EARTH

17. *The Ring that Formed Our Earth Considered.*—In our examination of the Hypothesis in the consecutive order in which the several bodies are supposed to have been introduced into our system, we deferred the particular investigation of the truth of the theory, as far as it relates to our earth, until we had briefly considered all the bodies included in the solar system.

We would now direct attention to the great ring thrown off by the nebula from which our earth was formed. It is understood that our earth absorbed and stowed away all the contents of that great ring of nebulous matter, leaving nothing to float away or be circulating through space, for otherwise that would militate against the theory.

This immense ring, the first step from the nebula in the formation of the earth, its step-mother, as it might be called, representing as it does, the circumference of the earth's orbit, must have been about 600,000,000 miles in circumference, also many millions of miles thick and broad or wide. Its size is beyond our comprehension. This immense ring of nebulous matter, according to many present-day writers on astronomy, in

the course of time, became so condensed and contracted that it finally resolved itself into one globe, forming our solid and compact earth. How this feat was accomplished, we cannot imagine. Will the advocates of the Hypothesis please give us the "modus operandi" of the transformation?

After the ring was thrown off by centrifugal force, generated by the rapid rotation of the nebula on its axis, the first thing for it to do was to get rid of the nebula imprisoned within its circle, or for the nebula to free itself from the ring. We do not know how it was done, but there are two ways in which it might have been done, certain laws being suspended. One would be for the nebula either to rise up or fall below the ring some 30,000,000 or 40,000,000 miles; the other way would be for the ring to break in pieces and scatter, or make an opening and let the parent nebula out; in which case, the aperture would have to be at least 70,000,000 miles wide. But both these ways are beset with difficulties. The great nebula, revolving rapidly, would, by its motion, be unable to rise or fall below the ring, and if it were possible for it to get rid of the ring in that way, it would find itself many millions of miles out, away from the plane of the orbit that is now known to be the same for the sun and all the planets. But if the ring separated and went to pieces, they would lose their power, and the pieces, by the law of gravity, would fall back into the great nebula. We leave

these and many other enigmas for the defenders of the Hypothesis to solve.

One mysterious thing about this great ring of nebulous matter that was over 500,000,000 miles in circumference, the parent of our earth, is, how under the sun (or over the sun, as this ring enclosing it must have been) did it get its long, anaconda shape together, and finally form one orderly, well-built, solid earth, of only 8,000 miles in diameter. It belongs to the advocates of the "Nebular Hypothesis" to state some plausible way in which it might have been accomplished.

18. *The Internal Condition of the Nebula When the Ring Forming the Earth was Thrown Off.*—It will be well to consider next, the internal condition of the nebula at the time it was supposed to have thrown off the material from which our earth was formed. The gaseous substance of the nebula was not supposed to be in any condition of order, separated, classified or stratified, for the inventor was not able to originate any scheme or plan, by which the heterogeneous mass of incongruous elements could be made to assume any order or place. Besides this, it is to be remembered that it is an important part of the Hypothesis that the molecules of the nebula, by reason of their rapid rotation, and the friction caused by their internal movements, converted the nebula into a heated and incandescent state, so that the rings, as they were formed, were thrown off in a burning condition; and in this

state of fusion, we ask, how would it be possible for the material elements to be delivered in any orderly state and place, and be preserved in an orderly strata, as now found to be in our earth?

The geologist knows all the various strata of earths, clays, layers of rock, etc.; and that they are arranged and classified in the general order, as found over the world. The late Professor Dana states that "stratified rocks are almost of universal distribution."

No such general orderly arrangement of the various strata of rocks, earth, veins and deposits of minerals, of phosphates, or the carboniferous age of coal, as now exist, and as the earth's records show, could have resulted from any nebular action according to the Hypothesis. There are also many other items which might be named, that cannot be explained or accounted for by the world-forming process of the Hypothesis, proving that it cannot be sustained by sound reasoning, and has no foundation in fact.

While we admit that the earth, on its surface and for some miles below, bears evidence of fire or great heat; that there are igneous rocks and minerals that have been in a molten condition, and show that there was once a period when extreme heat prevailed extensively; it was more or less local in its effects, and does not show that universal and destructive combustion predominated. Before we have finished, we expect to explain this matter satisfactorily, and show ade-

quate cause for the great heat, and how it was generated, together with some other important phenomena in God's creative work.

19. *The Nebula According to Laplace, not Dependent on Any Supervising Power or Agency.*—According to the "Nebular Hypothesis" of the formation of the solar system, that system is not dependent on any supervising agency or power to form, guide, or control its outcome, or any of the effects or results of the vast body of matter supposed to have been in motion; but is entirely independent of any all-wise, almighty, and supreme controlling power. The inventor of the Hypothesis does not acknowledge anything as being the work of a great Creator.

No truly reasonable man would ever adopt such a conglomerate, uncertain and haphazard procedure of making a world, or system of worlds; then how much less would the Almighty do, or allow it to be done. He cannot be charged with folly. We would be ashamed to write, or even think that the great Creator would adopt such a crude, uncertain, unreasonable and disorderly procedure in producing a solar system or a universe. He is ever wise in counsel, perfect in all His ways, and no creature can add utility, beauty, or glory to His works.

This "Nebular Hypothesis" of the French astronomer Laplace and others, that has been so freely accepted as true by many, particularly in this generation, does not seem to have been critically examined in its various aspects, or to

have had its assumption of facts tested and demonstrated, as most facts in science and nature have been. While Laplace cannot be ranked as a discoverer, like many other astronomers, he was evidently a great mathematician, and a plausible writer. By his mathematical talents, he solved problems and demonstrated the truth of the theories of other astronomers. His mathematical works have a high reputation; though it is stated that he did not always give credit due to other writers. The Emperor Napoleon, believing in his ability, appointed him Minister of the Interior, but afterward dismissed him as being incompetent for that work; as lacking practical sense and executive ability. Laplace lived in an age when infidelity and atheism prevailed in France, and the populace seemed to consider it a crime to acknowledge the existence of a God. They would not give the Divine Being credit for His creative works nor for the wise and beneficent laws of nature which He had established. To this day, the spirit of infidelity prevails in France, especially among the scientific classes. The "Popular Astronomy" of Flammarion, adopted in the schools of France, and so extensively consulted, does not, so far as we can learn, give the Creator any credit for anything seen in the universe.

The "Nebular Hypothesis" of Laplace naturally partakes of the spirit and sentiments prevailing in his age. It seems like a studied effort to produce a plausible scheme or plan of accounting

for the formation of the heavenly bodies, by material forces, without the designing aid or interposition of a Divine Creator, or any superior power whatever. The proper denomination of his theory, therefore, would seem to be, "Laplace's theory of the spontaneous generation of planet worlds and burning stars."

IV

THE NEBULAR HYPOTHESIS AND THE ASTRONOMERS

20. *Brief Review of the Opinions of Some Noted Astronomers.*—We honor the astronomers for their achievements, for the knowledge they have gained by their patient perseverance in the various branches of the science, for the important facts they have ascertained and demonstrated of the position, size, and various movements of the heavenly bodies, and the laws that govern them. We are astonished at the difficult, yet accurate calculations they have made, and are making, of the eclipses, transits, and other movements of the sun, planets and satellites of our system, all of which attest their knowledge, ability, and patient and persevering toil.

Among the most noted of the astronomers of modern times is Copernicus, author of the system of astronomy known by his name, and which was first published to the world about 1540. His system is now, with some modifications, universally accepted as being true. At first it was slow in being received, because its truth was not apparent to our senses, and was not considered orthodox, as it appeared to be opposed to the statements of the Scriptures, that the sun rises and sets and moves around the

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earth. The Scriptural rule, it would seem to be, in astronomical and physical matters, is to state things concerning them, as they commonly appeared to be, without explanations.

That great genius, Galileo, the inventor, mathematician, philosopher and astronomer, born in the sixteenth century, adopted the Copernican system, and maintained its truth against powerful opposition, even at the expense, for a while, of his personal liberty. Galileo is credited with being the discoverer of the satellites of Jupiter, and of determining their movements, and is also credited as being the inventor of the thermometer, the telescope, and other important scientific instruments.

Kepler, a great mathematician and astronomer, discovered the wonderful and exact laws that govern the planets in all their motions about the sun. He was the author of an elaborate and profound work on the laws that govern the bodies in our solar system, known as "Kepler's Laws"; and was also the inventor of logarithms. Kepler expressed the opinion that the sun was the source of the motion of all the planets as well as the source of light and heat. Richer discovered the diminution of gravity toward the equator; and Humboldt discovered the "decrease of the intensity of the earth's magnetic force from the poles to the equator."

To Sir Isaac Newton, the great philosopher, astronomer and mathematician, the world is indebted for much of the knowledge it possesses

and the progress it has made during the last two centuries, in the science of astronomy and the laws that control the heavenly bodies. The law of gravitation which Newton discovered, established, and utilized, has solved many difficult questions that heretofore had been unsolved by many intelligent thinkers. His theory of gravitation, as stated, was that "Every particle of matter in the universe is attracted by, or gravitates to every other particle of matter, with a force inversely proportioned to the square of the distance." Newton was the author of the theory of light: "That light was composed of material particles of inconceivable minuteness, emitted by luminous bodies, in all directions." By others, the undulating theory is maintained, which, at this day, seems to be the prevailing one. Newton discovered that "light was not homogeneous, but consisted of rays of different refrangibility, as proved and separated by the prism." Newton expressed the opinion "that the motion of the sun and planets could not be produced by any natural cause alone, but were impressed by an agent or divine power." He was a firm believer in the truths of revealed religion.

Sir William Herschel, born in 1738, discovered, in 1784, the planet Uranus. Sir William, with his son Sir John Herschel, were both enthusiastic and persevering astronomers. With their large and effective instruments, they, in their day, made many important discoveries, such as the satellites of Saturn, and also those of Uranus. They

measured and ascertained the rotation of some of the planets and their satellites; the motions of the double stars, and made many other important discoveries. The world is indebted to the Herschels, father and son, for much of the knowledge it possesses of the celestial bodies. They both accepted the truth of revealed religion.

By the singular and accurate calculations of Le Verrier, a French astronomer and mathematician, he was able to point out to Galle, an astronomer of Berlin, the probable location of an undiscovered new planet, which, when sought for, was found without difficulty where it had been located by Le Verrier. The new planet is known as Neptune, the farthest in our solar system from the sun. Truly this was a great triumph for the mathematicians.

21. *The Right of Independent Judgment.*—But when astronomers or scientists leave the region of ascertained facts, and, entering the field of speculation, propose and seek to establish theories inconsistent with certain known facts and natural laws, we have the right to use our reason and judgment, and inquire into the truth of their theoretical statements, especially when they cannot be reconciled to the present known state and condition of the world, the sun, and other bodies in our system; and more especially when they militate against the commonly received fact that there is a God who is not only the Creator of the world, our solar system, and the great universe, but who is also the author of the laws that gov-

ern it and all that is therein; and that everywhere, and in all things, the great Creator has manifested, as far as can be ascertained, a wise purpose and a perfect design in all His works.

The truth about the "Nebular Hypothesis" that, in this day, is apparently well received by many scientists and some professed astronomers, is that it is not maintained by sound reasons nor by ascertained facts, but by speculative and fallacious arguments, as has been proved; and, being a theory pernicious and atheistical in its tendencies, we have felt constrained to show that it has no substantial evidence for its support; that it is not sustained by any natural law or any definite and ascertained fact; but that, in truth, the whole hypothesis, from beginning to end, is derogatory to the Creator, and is altogether illusive, and unworthy of the credence or the attention it has received.

That well-known and popular writer, E. F. Burr, D. D., LL. D., author of the astronomical works, "*Ecce Cœlum*," "*Stars of God*," and other noted books, in expressing an opinion of the "Nebular Hypothesis" says, in the "*Stars of God*," (page 79), "The objections to this supposed history of the solar system are of two sorts. First are ascertained facts within the system itself" (which Dr. Burr proceeds to name, and then states) "These and many more such difficult facts make one sort of objection. Another sort is of a still graver character, viz: that the Hypothesis, if true, sets aside the argument

of design in the works of Nature, for the being of a God. Stated plainly in one form, it teaches that Nature is a natural growth from the humblest beginning; that worlds and their organic forms have slowly come up from exceedingly simple things by purely natural causation. Such, at least, is the understanding of the Hypothesis by its leading advocates. This is the understanding to the establishment of which all their efforts are directed. They insist on a natural genetic connection between any two consecutive variations in that long series of small variations, by which things are supposed to have crept up from the simplest structures, or from elementary atoms, to their present state.

"But whatever be the force that actually conducts Nature slowly upward along the succession of minute steps, whether it be natural or supernatural, if these steps are such and so minute that mere natural forces can easily take them, then proof of a God must come from some other quarter than from what we have been used to call His works."

This plain statement of Dr. Burr substantiates the opinion maintained, that the "Nebular Hypothesis" is purely an atheistical theory.

THE NEBULAR HYPOTHESIS AND THE SCIENTISTS

22. *The Wisdom and Power of the Creator Made Known in All His Works.*—In our attempt to show the fallacy of Laplace's whirligig theory of the solar system, it may be said that it devolves on us, to replace that popular hypothesis by some other theory or plan of procedure that will be more worthy of credence, more in accordance with natural laws, and which will account for the formation of our world by evidence that will command the assent of reasonable minds.

It is easier, we know, to undermine, pull down and destroy, than to plan, build up and establish; to object, and deny the truth of theories and propositions, than to make new ones and maintain them. Yet in this examination of God's creative work, we hope to be able to point out a way in which it was accomplished that will not only be worthy of consideration, but of the acceptance of candid and intelligent minds.

In an effort to trace briefly a few of the lines of the creative work that we both see and know, the writer would not attempt to account for anything that has been done, or is now existing, aside from, or independent of, the wisdom and power of the Almighty. Though it may not be

the fashion in these days, to give the great Creator the credit of His wonderful works, and the wisdom and power He has everywhere and in everything displayed, yet it would not do for the writer, who believes in the living God as the Creator of the universe, to fail to acknowledge both Him and His works, that speak for themselves and are ever declaring His glory. Nor will it do for the writer to deny or neglect the testimony of the Scriptures, verified as they are by a world of facts, and the testimony of the best men and women who ever lived.

We hold it to be a great and important truth, that the God of the Bible, the Divine Author of the Scriptures of the Old and New Testaments, is the Creator of the universe in which we exist; and that He, by His infinite wisdom and power, upholds and maintains the same; also, that this Almighty God has designed and made all things in the universe, and has given to the things He has made the definite nature and specific character which each may possess, whether particular or general; and that He has also ordained all the laws and influences of every nature and kind that govern, or in any wise control, the things He has made, be they material or immaterial; also, that this living God is the author and source of all life, of every kind and degree, vegetable, animal or spiritual, with all their variations and limitations which are now beyond the comprehension of the mind of finite man.

In order to apprehend more clearly God's way

of working out His plans, in developing His creative works so manifest in the universe, it will be well to inquire somewhat into His divine nature, as He has made it known to us in His Word, in His glorious works, and also, by His providential dealings with man in all ages, well known to students of the history of the world.

St. Paul, in addressing the Athenians (Acts xvii.), reminded them that they ought not to think that the "God who made the world and all things therein, is like unto gold and silver, or stone, graven by art or the device of man." So, on the other hand, while admitting the existence of a God, a spiritual Being, infinite in His wisdom and power, the Creator of the universe in which we live; it is not reasonable to conceive of Him as a being who would limit Himself in the exercise of His will in action by any general or universal law which He may or might have ordained, or that His acts, decrees, or operations, known and unknown, must be entirely in accordance with some general laws which we, with our limited knowledge of them, conceive, will not admit of change or suspension. God is too wise a Being to allow the universe in any respect to outgrow His power and control, or to limit Himself in anything it is right for Him to do.

In view of our limited knowledge of the various elements and forces found in Nature, and the laws that govern them, which knowledge has vastly increased in this nineteenth century, is

it not presumption on our part, for us to decide what the Almighty can or cannot do, with any element or thing in Nature; or what process He may adopt, without contradicting Himself, or subverting any of His laws? Neither ought we to conceive of the Almighty as a Being so far removed from all terrestrial concerns, and so preoccupied with the infinite and important affairs of His great universe, that he does not concern Himself with the details of His creative work, nor the individual interest and affairs of the creatures He has made to dwell on the earth. We ought rather to have a true conception of God, as He has plainly made Himself known to us, if we would rightly consider His creative work so far as it is known in the world and in the universe.

A true conception of some of the attributes of God we gather not only from His revealed Word, but also from His providential dealings with man, as individuals and nations, as recorded in the history of the race.

The Almighty, by His Word, works and acts, has revealed Himself to us, as a Personal Being, who not only creates and controls the infinite by the great things that are visible in the universe, but also as a Being who directs in the minutest details of the material things He has made, and also the nature and character of the infinite variety of living organisms and creatures that exist on the earth, providing for the subsistence of the smallest and least important, as well

as for the more noble and valuable of His creations.

The wonderful and glorious works of the Creator, and the apparent design of their creation, are known, or may be ascertained, by all students and careful observers of Nature. Intelligent thinking men are now at work in every department of knowledge or science, and are from time to time discovering important secrets of Nature for the benefit of the world, that were heretofore hidden from the knowledge of man.

The astronomer, with his telescope, the mineralogist, the chemist, the naturalist, the botanist, and others in every branch of science, by the aid of new and improved instruments and appliances, can, as they are doing, discover, bring to light, and apply to use, new facts and wonders found in Nature; every new discovery being but a stepping-stone to others, perhaps greater and more important. This continual advancement in knowledge is ever making more evident the wisdom, power and goodness of the great Creator.

With these few preliminary remarks, made in order to better explain our position, and state the ground on which we stand, we would note, First: In respect to the creation of the earth, the sun, planets and stars, as seen in the heavens day and night, that one is impressed by the magnificent display of power. And when we note that all the celestial bodies are apparently revolving about our earth, that the number of these stars, as well as their distance from us are beyond our

comprehension, and also, when we learn and consider how rapid, yet quiet, precise and orderly they are in all their movements, each having its own pathway through space, never coming in collision one with another, though the law of gravitation would naturally draw them together, we are compelled involuntarily to admit the wisdom and power of the Being who created the heavenly bodies and ordained the absolute laws which govern this universe of suns and countless millions of other bodies that exist and move within it.

So far as astronomers have been able to ascertain by observation, aided by their instruments, all the known bodies in our solar system are found to be regular in form and general appearance, and, though differing in size, they have, so to speak, an orderly make-up; and cannot, in any respect, be said to be a mass of material thrown together in a haphazard and promiscuous manner. They are found also, to be governed by the same uniform and perfect laws.

23. *Some Facts Relating to the Formation of the Earth. Also Theories That are Improbable.*—When we come to examine the geological formation of our earth, of which we possess a more complete knowledge than we have of the other celestial bodies, we find that it bears every evidence of being an orderly structure, built up layer upon layer. These strata of rocks, the upper differing in some respects from the lower, appear to encircle our globe everywhere in the

same order. The upper strata is built on the lower, like the layers of brick or stone in a large building. These layers are added to, or built up, and not grown up, or thrown out from the centre of the earth by some centrifugal force, as some would have us believe; for which assertion they can produce no evidence in proof.

The science of geology professes, in part, to ascertain and note the different strata of the earth's formation, which are known or believed to be the primary, secondary, and other rock formations; and in this branch of knowledge many important facts have been accumulated. Also it is a part of the science to ascertain the various disturbances and changes that have evidently taken place in the outer surface of the earth, and the probable causes of the same.

This science rests, as it should do, upon ascertained facts. But in some matters, or items, there have been interwoven causes for evident results that are based on speculative theory, and not on ascertained truth.

The popular theory, held by many scientists and others, is that our earth was once a burning mass; and that while it is now burned out or extinguished on its surface, it is still burning in its interior; and, toward its centre, it is even now in a molten condition.

This theory of the condition of the earth is taught or accepted by many writers on the subject, and seems to be the prevailing one in this age. It is also in harmony with Laplace's "Neb-

ular Hypothesis," and is supported by its advocates.

What this theory is, as it relates to our earth, will be better understood by extracts from some of the works of its authors and defenders. Quoting from "Popular Astronomy," by Camille Flammarion, of France, that work states: "There was a time when none of the species now living, existed on the surface of the globe. There was a time when life itself did not exist, in any form whatever. Even the figure of the terrestrial globe, its flattening at the poles, the arrangement of the lands, the mineral nature of the lower primitive strata, the volcanoes which still smoke and throw out their fiery lavas, earthquakes, the regular increase of temperature as we descend into the interior of the globe,—all these facts agree in proving that in primitive times the earth was uninhabitable and uninhabited, and that it was first in the condition of the sun, hot, luminous and incandescent."

The author goes on to state the cause of this condition of the earth, and his view of Laplace's "Nebular Hypothesis" as follows: "Well, the most probable hypothesis, the most scientific theory, is that which represents the sun as a condensed nebula. This carries us back to an unknown epoch, when this nebula occupied the present place of the solar system, and even more, an immense lense-shaped mass of gas, turning slowly on itself, and having its exterior circumference in the zone which marks the orbit of

Neptune." The author then proceeds to state the process by which one planet after another was formed from or thrown off from the nebula, which we have before stated in our examination of that hypothesis, and which it is not necessary here to repeat.

The author proceeds to state: "Afterward came the earth, of which the birth goes back to the epoch when the sun had arrived at the earth's present position. Venus and Mercury would be born later. . . . Will the sun give birth to another world? This is not probable. For this purpose, it would be necessary that its rotation should be enormously accelerated. It should be 219 times more rapid." (That is, the sun, at its surface, now passing through space, at the rate of 104,800 miles in one day, would, according to the author's theory, have to revolve at the rate of 7,621,200 miles in one day.)

Quoting again from the same author: "Thus the world was formed by the slow condensation of a gaseous ring detached from the sun. From a gaseous condition it became liquid, then solid, and doubtless, it continues to cool and contract even now. But its mass increases from age to age by the meteoric stone and shooting stars which continually fall upon it,—more than 100,000,000,000 per annum." If that is so, it is a wonder we are able to preserve our eyesight.

In the absence of some plausible theory accounting for the formation of the earth and our solar system, it would seem that certain Chris-

tian philosophers have been inclined to accept, in a greater or less degree, Laplace's hypothesis of the formation of the solar system, independent of the aid or intervention of any Divine Being.

Mr. Goodwin, in his "Essays and Reviews," says: "The first clear view which we obtain of the early condition of the earth, presents to us a ball of molten fluid, with intense heat, spinning on its axis and revolving round the sun. How long it may have continued in this state is beyond calculation or surmise. It can only be believed that a prolonged period, beginning and ending we know not where, elapsed before the surface became cooled and hardened and capable of sustaining organized existences. The water which now envelopes a large portion of the face of the globe, must for ages have existed only in the shape of steam, floating above and enveloping the planet in a thick curtain of mist."

The Rev. Dr. Campbell, in his "Story of Creation" (p. 45) writes: "This world was once a globe of liquid fire. It remains so yet indeed. As to its principal bulk, it is the same molten mass as in the times referred to. It is like a deep lake frozen over; and we build our cities on the ice crust, as it were. This, however, makes the earth but a shell. (p. 43.) There are places on the globe, no doubt, where the earth's crust may be 100 miles thick."

Note that such a condition of things, or of the elements, is incredible. It simply would be impossible to maintain such an extreme degree of

heat without a constant supply of oxygen and other combustible matter. Heat requires consumption of material. What material is being consumed in the centre of the earth? Besides, heat is a most active, expanding and forcible element, ever asserting itself; and it would be simply impossible to confine it in this earth, which is a mass of disintegrated material.

When the earth was in its supposed condition, the intense heat generated would not only have turned all of the supposed water on the earth into an intensely heated steam, but that extreme degree of heat would also have turned many other elements, including metals, into steam, which, when the earth cooled down, according to the theory, would have appeared with the water on the surface of the earth, deposited like a coat of snow, hail, or mail, covering the whole surface of the earth. Under such a condition of the elements, it would have been impossible to have had metals and other items deposited in distinct veins and beds, as they now exist.

The learned Dr. Dana, in his "Manual of Geology" (p. 146), in the article on "Archæan Time," writes: "There must have been a first era after that of the original nebula, *if such there was*, in which the earth was a globe of molten rock, like the sun in brightness and nature, enveloped in an atmosphere containing the dissociated elements of the future waters, and whatever else the heat of the surface could throw into a state of vapor. A second era, in which cooling

went forward, until the exterior became solid from cooling, and probably as a crust over liquid interior; and still, in the second place, the vapors of the atmosphere were mostly condensed, and an envelope of waters, nearly, or quite universal, was made."

VI

THE ATOMIC AGE OF CREATION

24. *How Was the Earth Formed? and What Are the Simple Elements Composing the Material Earth?*—The question in which we are interested, and that remains to be solved, is how, or by what means, was the earth,—this planet on which we dwell,—formed or created?

In an attempt to arrive at a solution of the problem, there are two questions that must be answered. The first is: "What are the elements, or at least the principal ones, known to constitute the material substance of the earth and the world?" The second is: "What is the general nature or character of these elementary substances; how made or created; and how and why their varied combinations?"

As we examine the surface of the earth in all its parts and places, we discover an endless variety of material things, differing widely, in many respects, from each other. As we dig down into the bowels of the earth, we find new varieties and classes of materials. As we search and examine the atmosphere, the elements above us, and the water below us, the contents of the rivers, seas and oceans, we find a still greater variety of objects that attract our attention and

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command our admiration; things animate and inanimate, too innumerable for the mind of mortal man to grasp, or his reason to comprehend.

The beauty and grace of many things, the fragrance, richness and value of others, the varied characteristics, qualities and uses of thousands of items that might be named, fairly astonishes one at the magnificence of nature's display: things material and things immaterial, too ponderous to be moved, too light for the analyst to weigh, or too fragrant for the chemist to compound. But, when we consider and investigate, we are surprised to learn from the analyst, the chemist, the microscopist and others, the absolute fact, that these tens of thousands and more, of material things, are all composed of a few simple elements, some sixty or seventy in all; and that by leaving out the metallic elements, a man's fingers would represent the number of the simple elements composing the greater part of the material globe.

The simple elements, oxygen, hydrogen, nitrogen, carbon, and a few others, constitute, as far as is known, a great part of the material earth. These facts are wonderful, and, being beyond the common observation of man, they are hard to be realized, or even believed.

Many facts unknown to the ancients, have been discovered by the genius and perseverance of modern scholars and investigators, aided by the appliances and inventions of this progressive age. The opinion has been expressed by some scientist,

that by a more thorough examination, aided by more perfect instruments and appliances, the number of the simple elements may, and will eventually be reduced. The few and simple elementary materials forming the main substance of our planet, appear, as far as has been discovered, to enter largely into the composition of the other bodies in our solar system.

Considering these facts, that have been demonstrated time and again, we begin to realize in some measure, how few and simple, comparatively, are the elements that do, or may, enter into the material composition of the mighty universe.

25. *The Atomic Age of Creation. Design and Wisdom Manifested in the Creation of the Simple Elements.*—Contemplating also these leading facts, do they not bear intrinsic evidence that among the first creative acts of the Almighty, were those of creating the particular and distinctive atoms, forming, with their combinations, the simple elements that constitute our world and solar system, and probably in part, the universe itself. We reason, therefore, that there must first have been in the creative periods of the Almighty, an age that might properly be called the "Atomic Age of Creation." Ages, long ages ago, so many that we do not care to think of it, for it staggers one; He who knows the end from the beginning—the far-seeing, all-wise God—created the simple atomic elements with their varied attributes and qualities. From what the

analyst, chemist, microscopist and others, with their improved instruments, have discovered and recorded, it is evident that the molecules or atoms of matter have each a distinct nature and character, differing in some respects from other classes or orders of atoms, so that from their combinations with atoms or materials of dissimilar natures or characters, there are found to be resultant materials of such a marked character that their distinctive natures are evident to the eye or the senses of man.

The Atomic Age of Creation included the particular endowment of properties and qualities to some certain atomic elements, but not to others. Hence one atomic element has an affinity for some one other element, and a seeming aversion for other elements. It included such properties as that of the magnet which attracts iron, but has no apparent influence on gold or silver. In like manner the elementary force of electricity finds a good conductor in one element, but refuses to be carried along by others; while gravity is made inherent to material substances, and, in a measure, controls them. It also included thousands of other similar items and conditions, all of which must have been determined upon by the Creator from the very beginning of His creative work.

These and many other facts make it plain that in the beginning, or in the "Atomic Age of Creation," there must have been manifested, on the part of the Creator, a wise design for every particular class of atoms, giving to each new ele-

ment, its particular character and attribute; followed by a perfect execution of His plan, comprehending from the beginning, the results of all future combinations with any one or any number of other classes of atoms, whatever they might be, and then and there, fixing and determining the law of their nature, and the limit and scope of their influence and power.

The atomic elements, then created, entered not only into our solar system, but into the universe. For example, consider a few of the gaseous elements, as oxygen, hydrogen, nitrogen, carbon, etc.; elements all differing from each other in their atomic character and nature, and in the size and weight of their cells. Their effect on our senses in their separate, uncombined state, is more or less deleterious to life, each having a greater or lesser effect on all animate and inanimate bodies, beneficially or otherwise. Let the elements having a mutual affinity for each other, as oxygen and hydrogen be combined, and the results are truly marvellous. Take two volumes of hydrogen and one of oxygen, or by weight, two parts of hydrogen and sixteen of oxygen combined, and lo, we have that wonderful, that divine element, water; without which the earth, the world, would be a dreary waste, destitute of life.

It is well also to consider the composition, nature and value of that elastic element, the atmosphere, that encircles our globe, composed as it is, of about seventy-nine volumes of nitrogen and

twenty-one of oxygen. It is the element in which we all live, that supports all life; and, like water, without it, vegetable, as well as animal life would cease. Even the fish in the sea depend upon the air contained in the waters for their continued existence. Besides these necessary requirements for the air we breathe, there are other innumerable important uses and benefits which the world could not do without, derived from the atmosphere that envelops the earth, which are known to all intelligent minds, but which are never fully realized.

Let the intelligent man consider carefully the simple elements, oxygen, hydrogen, nitrogen (as well as others) in their separate gaseous state, or in their original atomic condition, and weigh in his mind the distinct properties and capacities given to each individually, and the results and effects planned or designed for these elements by their Creator, in their several combinations, according to the limits and proportions He has marked out, and then put the question: Can any reasonable mind hold for a moment, that these several elements, together with their combinations, producing such wonderful and splendid results, proceeded from any chance, and not from wise design? The nature of each, with their resultant effects, how distinct, precise and accurate are they beyond our comprehension.

26. *Wisdom of the Creator in the Special Laws with Which He has Endowed Water.*—We refer again to water, that divine element, won-

derful in its nature, its properties, its attributes, its power and influence, the place it fills, and the work it performs; the world and all nature ever depending upon it and craving for it. If water were not so free and abundant, gold could not be exchanged for it. It is a prime necessity; it is priceless. There is no other such element in the world, and probably there is none such, or none to excel it, in the wide universe. The Almighty, when He created it, and endowed the world with this gift, knew from the beginning what it was to be, what He had designed it to do, and the purpose it was to serve in this world which He was preparing as the abode of man.

When God gave this element to the world, in order to make it perfect, to do its work and fulfill its course at all times and under all conditions, He ordained for it special laws to control and govern it under all circumstances: laws not common to other fluids.

Some of the properties of water and the laws that govern it, we will now mention. This water (H_2O) composed of two parts of hydrogen and one of oxygen, is the life of the world, for without it the world would be dead. As we are constituted, it is evident that without water, there could be neither animal nor vegetable life. Without it seed would not germinate, and all vegetation must perish. It would be hard to tell, even in the mineral or material world, what the condition of things would be if water had not been created, for this element has entered

into the composition of thousands of material things. Countless millions of mankind, the good and the evil, are and have been thankful for the gift and the daily use of this life-giving fluid. All nature, animate and inanimate, rejoices in the unceasing blessings that, in water, flow to them.

The following are some of its properties:—It is an almost universal dissolvent; it enters into the composition of a vast number of materials; it is irrepressible; it keeps its size and volume under great pressure; a gallon of water three miles down at the bottom of the ocean occupies as much space as at the top, and contains there the proportion of the air required for the sustenance and preservation of the creatures that live in the sea.

Water immediately finds its level. It moves without friction; creatures and vessels pass through it without resistance, so far as friction is concerned. Its buoyancy (at 60° Fahrenheit) is always the same. The specific gravity of water as (1) is the measure of the specific gravity of all materials.

Water, when its temperature is raised to 212° Fahrenheit, goes off in the form of steam, by which action its volume is increased 1,600 fold. As it returns at a lower temperature to its normal state, it steadily shrinks in volume until it reaches 40° Fahrenheit, when, in subjection to an extraordinary law of its nature, it ceases to contract and begins to expand, as it decreases in its temperature, until it reaches 32° Fahrenheit, when it ceases to be a fluid and becomes a solid known as ice,

floating on the surface of the water. As the cold increases or the temperature of the ice decreases, it still continues slowly to expand.

This fact is well known to all common observers. This special law that governs water is an unusual one in the history of those natural laws that control the elements of the earth. Were it not for this provision ordained for it, the waters of the earth would sink to the bottom of ponds, rivers, lakes and seas as fast as they were frozen, and being there below the melting influence of the sun, would receive continual additions of ice or frozen material until all became one solid mass. One result of this would be the destruction of all that lived and moved in the waters. The glaciers themselves, that now float in the oceans, would go to the bottom. The rivers, seas and oceans would, in time, cease to be navigable; and the earth itself would be made uninhabitable.

From the statement of these facts and their consideration, is it not evident that there was an intelligent design, and a wise and beneficent purpose in this natural law which ordains that water, at a certain fixed temperature should cease to contract, and, as it afterward decreased from that point, in temperature, either as water or in the condition of ice, it should expand and, as ice, be made to float on the surface, rather than sink to the bottom.

There are other important laws governing this element of water in its various conditions, such as its latent and also its specific heat.

Professor Balfour Stewart, in his "Primer Physics," published by D. Appleton & Co., has, in a clear and concise manner, stated facts on these items, some of which we here quote:—"Thus we see that ice requires latent heat to bring it into water, while water again requires latent heat to bring it into steam. Now we can measure how much heat it will take to bring a pound of ice at 32° Farenheit to a pound of water at the same temperature, and we find it will take as much heat to do this as it would to raise seventy-nine pounds of water one degree in temperature, and this is what we mean, when we say that the latent heat of water is equal to seventy-nine degrees. In a similar manner it has been found that the latent heat of steam is 537, that is to say:—it will take as much heat to change a pound of water at 212° Farenheit into steam of the same temperature, as it would to raise 537 pounds of water one degree in temperature."

It thus takes a good deal of heat to melt ice, and it therefore takes a good deal of time to do so. Indeed, it is much better that this is the case, for what would happen if ice, at the melting point, were to change into water at once when heated ever so little. It would render uninhabitable a large part of the globe, for the ice of the mountains would, on some fine spring day, be at once liquified, and the water would rush down in such overwhelming torrents as to sweep everything before it, and large

tracts of low-lying land would be buried under water.

In like manner, it is much better for us that it takes a large amount of heat to convert water at the boiling point into steam: for, suppose that water at this point were at once converted into steam by heating it ever so little, there would be an explosion in every teakettle and in every boiler, while a steam engine would be an utter impossibility.

The particular and specific limitations placed on water, as here mentioned, by the especial dispensation of the Creator, manifest beneficent design, and prove His wisdom and power to give to an element just such attributes and qualities as He desired it should possess.

In reference to specific heat, Professor Balfour Stewart also writes:—"Some bodies require a greater amount of heat than others in order to raise their temperature one degree. The quantity of heat required to raise a pound of weight of any substance one degree is called its specific heat; that is to say, it requires more heat to raise a pound of water one degree than it does to raise almost any other substance. The heat required to raise a pound of water one degree will raise through one degree nine pounds of iron, eleven pounds of zinc, and no less than thirty pounds of mercury or gold."

Some of these facts relating to the natural laws that govern water, as given by Professor Stewart, are not realized nor as commonly known and

understood as that law which governs the expansion of water at the temperature of forty degrees and less. They are, in and of themselves, of vast importance. In respect to water. Suppose, for instance, that it received heat, became warm and hot as readily as other elements do, the sun would soon greatly raise the temperature of all bodies of water exposed to its heat,—rivers, lakes, and seas, especially in southern latitudes, would be brought almost if not quite to a boiling temperature, and as nearly three-fourths of the surface of the earth is covered with water, the increased heat on the whole earth would be unbearable. The increased evaporation that would also ensue would envelope the earth in an atmosphere of fog. But it is useless to state what might happen.

One reason why we have called attention to this particular element, water, has been to prove that there is in this element indisputable evidence that God adopts adequate measures to accomplish His ends; that He can do or stop doing; make restrictions or put a limit on some things, saying "thus far shalt thou go and no farther," when it is His will or purpose so to do.

The nature and history of water, as known to man, is sufficient evidence alone, of the being, wisdom, power and goodness of the Almighty God. Water is no machine-made element, the product of some general law; neither is it the product of evolution. The Evolutionists, under their theory or plan of procedure, cannot devise

a way by which it could be formed or controlled.

The elements, oxygen and hydrogen, in other combinations, and under other circumstances, are not controlled, as far as is known, by any such laws as those that govern the element water.

In considering the atomic elements found in the world, we learn that each class of atoms has its own peculiar nature, its own special and distinctive qualities, and its affinity for, or power to combine more or less limited, with one or more of the other atomic classes; that for each separate class of atoms there is some law of affinity controlling them in respect to other atomic classes, sometimes stronger for one than for another, leaving one for another, and thus resulting in a great variety of what might be called natural combinations.

The primary laws controlling all classes of elementary atoms ordained by the Creator, are unknown to us, and beyond our comprehension. The men of science have ascertained many facts and results, but the why and the wherefore of all combinations, and their extent, under different conditions, including the crystallization of elementary atoms, is known only to Him.

The pure and simple elementary atomic materials that form the substantial body of this earth, are few in number, as before stated. Of the non-metallic, the most important are oxygen, hydrogen, nitrogen, carbon, chlorides, and a few others.

27. *Innumerable Results from the Varied Combinations of the Simple Elements.*—As the few letters of the alphabets of all written language form the words that make up and fill the tens of millions of books in the world; and as the few vowel sounds represent the sounds found in the syllables of all languages that make up the multitudes of the world's books, that express, define and make known all things and all events for all times; and as the few musical notes and tones, employed in the music of all songs, be they notes of praise, joy, sorrow, or otherwise—all governed, as they are, by the laws that God has made for them—these notes, comparatively few, are all that are known or sounded in the music of the world; so, in like manner, do the few simple elements that we have before named, form and constitute the vital and important parts of our material world, and probably, so far as we have knowledge, of the other worlds also.

It is not always the great things that are the most wonderful; for often the small things command our admiration more than do the great, like the atomic elements, with their defined and specific nature and their peculiar combinations. The great things in nature are but the accumulation of the small.

28. *In the Creation of the Atomic Elements and the Laws That Control Them; the Wisdom, Power and Order of the Almighty are Manifested.*—We have mentioned particularly the

simple elements, oxygen, hydrogen and nitrogen, that we might consider and realize, in some measure, how singularly characteristic, how perfect in adaptation, how comprehensive in application, and how beneficial beyond measure, in results, are some of the atomic elements created by the Almighty. How precise, well defined and wonderful they are in their effects and results, both separately, and in their several well-known combinations. How valuable are these simple elements to the earth, the world, and all therein. Without these elements, there could be no life, animal or vegetable. The world would be lifeless and barren as the moon is believed to be.

It ought to be evident to all considerate minds, that these elements were wisely designed and created, or caused to exist for special purposes; and that special laws were made to control them in all their operations, at all periods and under all contingencies.

The ability and wisdom of an architect, designing and erecting a great building, is weighed and measured by his work. His reputation rises or falls, as those who are able to discern, observe the merits of the structure in all its parts, or note its defects from its foundation to its topmost stone. In the design, plan and construction of the edifice, they would note whether or not there was a wise and orderly arrangement of the several floors, halls, rooms and apartments, all adapted for the use and purpose for which the

building was erected. If they found there was utility, order, and beauty of design, perfection in execution, and every want provided for, they would unhesitatingly declare it to be the work of a wise master-builder.

In the construction of this world, no fault can be discerned nor pointed out. It is complete in all its appointments. There is an orderly arrangement of all things in the world, and a wise adjustment of the materials and all the elements in respect to weight, quantity and other items. The laws that control internal matters and govern external affairs are exact and perfect. St. Paul writes, "For every house is builded by some one, but He that built all things is God." He is the great architect of the universe; and the earth and the heavens daily declare His orderly, perfect, and glorious work. He is the God of order and not of confusion. The universe itself is a sublime evidence of the fact that order is the foundation principle of His government. Order allied to "holiness becometh thine house, oh Lord."

Pope writes, "Order is Heaven's first law." This, it would seem, must necessarily be true. But before order can be secured and maintained, there are, and must be, certain conditions inherent or belonging to the persons, things, or elements in question, to cause them to become and to abide orderly in their true place and condition. There must be some distinctive nature, attribute, character, quality or affinity, or they must be

made subject to some influence of a positive or negative character, that may or will operate to incline, direct, or compel the thing to take its proper direction or natural place, like the well-trained soldiers of a regiment who will, on the order being given, immediately take their true place in the ranks. But let the order be given to untrained men, and it would take them a long time to find the place where they belonged. This homely illustration shows how apparent it is that there must be some definite character, attribute, or elective affinity, chemical, electric or magnetic influence possessed by the person, thing, atom, or element, before it would move, or be moved, and take definitely its proper place in respect to its surroundings.

Some elements are quite peculiar in their character, conduct, influence or power. For instance, while the electric current passes through all metallic bodies, and finds good conductors of its energy in or through many other things, there is that other element, magnetism, which, while in some respects it appears to be of the same nature, yet is quite limited in its influence and power, acting only on iron and steel, and a few other metals. While magnetic currents are intercepted by thin plates of iron or steel, as light is by any opaque substance, these magnetic currents pass through gold, silver, copper, and other substances, without hinderance, as light does through clear glass. Why is this? Why should this element in these particulars be so limited and

specific, and be made also subject to electric currents passing through the earth? These electric currents are not adapted to, nor can they be made to take the place of, the Mariner's Compass, nor control the magnetic needle that God has provided to guide man in his travels over the earth and sea.

The force of gravitation, which has a certain control over all material bodies possessing weight, is a condition or power bestowed on matter by the Creator.

From all that we are able to learn or discover, there is not found in the wide world, a person, element, or material thing, to which God has not ordained or affixed some distinctive nature, character, quality, attribute, or made subject to some law, affinity or influence, positive or negative in its character.

This rule or law relates to spirits, to the spiritual and moral qualities of beings subject to spiritual influences, as well as to all material elements, imponderable as well as ponderable. Spiritual natures have their affinities, their likes and dislikes that rule them. Bad as this world is, Judas the traitor found it too good for him, and so hastened to hang himself, "that he might go to his own place," as St. Peter has said.

In endeavoring to ascertain what may be learned relating to the formation of the earth—the creation of the world—it seemed necessary to note first some of the material elements used in the great work; their nature, character, and

adaptability for the work required; and how these atomic materials were at the time carefully and precisely prepared for the particular place and service they were to fill, as it is recorded of the Temple of Solomon, "built of stone, made ready before it was brought hither."

The material elements of the world, at least those on the surface of the earth, are seen and generally known. But as St. Paul writes, "The things which are seen, were not made of things which do appear."

We have no means of ascertaining how far the same atomic elements of our earth enter into the material substance of the sun and other members of our solar system. It is known, however, that the sun possesses elements foreign to our world; their nature and attributes being unknown to us.

VII

A REVIEW OF THE MOSAIC RECORD

29. *The Question How was Our Earth Formed? A Review of the Mosaic Record.*—The important question that remains to be solved is, how was our earth formed or created? Are there any means of ascertaining on what plan, or by what process, and what were the agencies employed to bring about the grand result—the formation of this world to which we cling?

When we go outside of the material earth itself, seeking evidence of its creation or the process of its formation, most persons, in civilized countries at least, turn to the Bible,—the Scriptures of the Old and New Testaments—expecting that book to impart the necessary information and give the facts concerning the creation of the earth. At least they expect the record of "the six days' work of creation," as it is called, contained in the first chapter of Genesis, will, as at first it seems to do, tell them what they desire to know.

That record has been examined, investigated and studied, probably, more than any other portion of the Scriptures. Men have reasoned, disputed, and quarrelled over it, time and again. They have puzzled their brains over its several

statements, some declaring that they mean one thing, and others, another thing. The record has seemed harder for theologians to explain, than for mathematicians to square the circle. In this generation, many men, professed believers in the truths of the Bible, have given the matter up in despair, not desiring to talk or even think about the question. As some people judge a book by its covers, so many have judged the Bible by its first chapter, and because of this opening difficulty have condemned the whole book; while Moses, the inspired man of God, has lost, it would seem, his reputation, and fallen from the high place he once had among the saints. In time, we believe, he will be restored to his old place, and then it will be freely admitted by intelligent men that Moses has not blundered or made grievous mistakes, but that his critics have, by their failure to comprehend the scope of the truths he recorded, and by their assuming (without reason) that Moses' record of the "six days' work" included the whole of creation, when, in fact, it was only a very small part; and that part confined to things on the immediate surface of the earth.

In respect to the Mosaic record of the "six days' work of creation," it has been, for thousands of years, the prevailing opinion of readers of the Scriptures that Moses' description of that six days' work included not only the vegetable and animal life created and now known to exist on the earth, but also the material earth itself, in-

cluding all its simple, primary elements, with all their geological formations.

For several generations, the best thinkers and writers interested in the matter, have made great and constant efforts to reconcile the Mosaic record with the known facts relating to the geological formation of the earth, and the periods of time involved; and have advanced various speculative theories, and made all sorts of explanations, some of them absurd, and none giving satisfaction to, or meeting with the full assent of, intelligent minds. The natural effect of all this has been to create a spirit of unbelief in the truth of the record and, in many persons, a loss of faith in the Bible itself.

The writer, believing that the Scriptures of the Old and New Testaments were written by men who were inspired of God, and that the facts, principles, and statements therein contained, were and are true, although the exact words cannot now be verified, because the original language in which they were written is not now spoken nor definitely known; and because the many thousands of transcribers of the records, from the days of Moses to the present time, were mortal men, whose work none will guarantee to be free from error.

Nevertheless, the writer has accepted these statements of the Scriptures as truth because, in the affairs of life, in the history of man, and in many ways, he has believed not only by what he has seen, but has tested for himself the truth of the

Scriptures a thousand times, and has ever found their statements reliable and true in all matters where his reason, knowledge and judgment were competent to decide. Not only so, but the verity of the Scriptures is confirmed day by day by millions of men and women whose judgment is worthy of all acceptance.

Therefore, so far as the Mosaic record of creation was concerned, the writer believed it stated the truth, though it seemed to be a hidden mystery. For thirty years or more he wondered at, and sometimes felt like complaining because Moses had not given at least a few words of explanation in his record.

Some twenty-five years ago the writer, on reviewing the text, and considering the matter again, came to the conclusion that the Mosaic description of the "six days' work" had nothing at all to do with the creation or geological formation of the earth, but was only his description of the events that daily took place in their regular order, and in the order in which an intelligent observer would have credited their first appearances, had he been on the spot, and in a suitable place to do so.

The more we have investigated the matter, and that in every point of view, the stronger are our convictions that the Mosaic record was not intended to give even a hint of any of the particulars of the creation of the heavens and the earth,—save that it was all the work of God in ages long past.

As the Mosaic record itself may not be familiar to most readers, it may be well just here to review it as given in the revised version of the Bible.

First chapter of Genesis, first verse:—"In the beginning God created the heavens and the earth." Comment:—It will not be denied that creation was a work, and not an act. The most obvious rendering, therefore, according to the fact, would be, "From the beginning God began to create the heavens and the earth."

Second verse:—"And the earth was waste and void." "And the earth was waste." Comment:—At that particular time the earth was "waste," which we understand to mean that it was lying unoccupied, unused, like a great farm all ready for use, and the ground prepared for the seed; though it had for years remained uncultivated.

The record states,—"The earth was void." That implies that the earth, whatever may have been its previous condition, was at that time empty, unused, bereft, destitute of all life, either vegetable or animal.

The record further states:—"And darkness was on the face of the deep. And the Spirit of God moved, ('or was brooding,' marginal notes,) upon the face of the waters." Comment:—This condition of darkness, that then enveloped the earth, was evidently that state referred to by the Almighty in His address to Job, (see Job, chapter xxxviii.), saying, "When I made the

cloud the garment thereof, and thick darkness a swaddling-band for it." This fact and statement we will have occasion to refer to and explain later, then proving that it was a necessary proceeding in God's process of completing the world and preparing it for the present orders of vegetable and animal life, and for being a perfect habitation for man.

It is next recorded in Genesis. "And God said, Let there be light: and there was light." By which we understand that outside of the earth, beyond the cloud of darkness, there had been shining for ages, the light of our sun, which light, by the command of God, now pierced through and dissipated the thick darkness and lighted up the face of the earth.

It is recorded that the "Spirit of God moved upon the face of the waters,"—above the waters, in the fluid or atmospheric elements which were under control and power of the Spirit, so that when God said, "Let there be light," then by some electrical force, instantaneous action, chemical affinity, or other process known to God, the fog or cloud of vapor was so dispersed or clarified, that the light broke through and appeared on the earth's surface, though its real source, the sun, was at the time unknown and hidden from the view of any observer on the earth. It is further recorded that God pronounced the light good, but this does not state or imply that it was extensive or all-pervading.

It is recorded further "And God divided the

light from the darkness,"—that is, made a distinction between the light and the darkness—"and God called the light Day, and the darkness He called Night. And the evening and the morning were the first day." This account is very simple, and the meaning plain. The work of one day only is described. The beginning and end of its two divisions are so definitely named that there ought not to be any doubt about the length of the days of creation named in Genesis.

It is recorded in the sixth verse:—"And God said, Let there be a firmament in the midst of the waters, and let it divide the waters from the waters." Seventh verse:—"And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament: and it was so." Eighth verse:—"And God called the firmament Heaven. And the evening and the morning were the second day."

The Hebrew word called "firmament" in the old translations and editions of the Bible, is now, in the new version, translated "expanse," and it is admitted by learned Hebrew scholars that the word expanse expresses the true meaning of the original word, and that rendering is now generally accepted.

The important and radical changes in the atmosphere enveloping the earth, which were commenced on the first day, were continued through the second. The darkness that covered the earth at that time was evidently referred to

by the Almighty in His address to Job, referred to above. The encircling band of darkness, whatever may have been its constituent elements, was now broken; this cloud was now separated, scattered and dissipated by the Spirit of God, as by a mighty wind.

It is recorded that on the second day, "God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament; and it was so. And God called the firmament Heaven: and the evening and the morning were the second day." Calling the firmament "heaven" was teaching men to look upward to heaven and to God who is the author and source of all heavenly blessings.

God made the "expanse." Modern scholars give proof that the latter word expresses the true meaning of the original; and it also agrees with the facts of the case, while the word "firmament" does not, for that word conveys the idea of solidity, firmness, in the sky above us, as it was thought to be by the ancient Hebrews. Dr. Adam Clark, in his commentary, in giving the correct meaning of the word, says: "The Hebrew word 'Rakia' means to spread out, as the curtains of a tent or pavilion, and simply signifies an expanse or space; consequently, that circumambient space or expansion separating the clouds which are in the higher regions of it, from the seas, etc., which are below it."

"And God said, Let there be a firmament in the midst of the waters, and let it divide the waters from the waters. And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament: and it was so." Genesis i. 6, 7.

Adopting the view that the constituent elements of the air had long before been prepared, measured, equalized, and brought together, and that the atmosphere was now purified or free from all deleterious gases; the scope of the work recorded as being performed by the Creator on the second day, appears to have been the increasing and extending or expanding of the atmosphere far above the earth which it encircled, and bestowing upon it the many peculiar qualities which it possesses,—the appearance of the blue, ethereal sky; its power of transmitting light or heat, and refracting the same; its capacity to absorb water and hold in suspense clouds of vapor, and its facility for distributing and discharging the same over the earth; also, its power of sustaining the life of everything that breathes, and all that grows, besides other innumerable uses which may not be apprehended.

The spectator recording the events, would observe the clouds during the second day rise toward heaven and extend all around him, so that the field of vision above and in every direction was greatly expanded and enlarged. The vapor or waters in the clouds above, were seen to be

divided or separated from the waters below the expanse of vision.

The firmament or expanse witnessed by the observer and recorded, was what we should call our sky; the apparent arch or vault of heaven; the region of clouds, winds and rain; the part of the earth's atmosphere in which meteorological phenomena take place; our sky, the immense expanse encircling the earth wherein is formed the gentle dew, the drops of rain, the zephyr breezes, the stormy winds and gales; the flashing lightning and the pealing thunder, clarifying and purifying the atmosphere; the sunshine and cloud-shadows; the dark days and the bright ones; and many other items might be named, all bearing results beneficial to vegetable and animal life. We could not exist, constituted as we are, without the protecting influence of the expanse,—the so-called firmament—the sky, our atmospheric surrounding.

Continuing the record, ninth verse:—"And God said, Let the waters under the heaven be gathered together unto one place, and let the dry land appear: and it was so. And God called the dry land Earth; and the gathering together of the waters called He Seas; and God saw that it was good. And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit-tree yielding fruit after his kind, whose seed is in itself upon the earth: and it was so. And the earth brought forth grass, and the herb yielding seed after his kind, and the tree yielding fruit,

whose seed was in itself, after his kind: and God saw that it was good. And the evening and the morning were the third day."

It is worthy of particular notice that the work recorded to have been done on the first and second days, and on the first part of the third day of creation, was mainly atmospherical changes of various natures, kinds and degrees, including the dissipation of the thick cloud of darkness that for a long period had enveloped the geologically completed earth, until, by the command of God, the light passed through and lighted up the surface of the earth, though the clouds, as yet, had not entirely disappeared.

The spectator, on the morning of the third day, in viewing the landscape before and around him, would have beheld not only the dry land,—the earth,—but various streams and bodies of water, some large ones, called seas. He would have noticed in the morning of the third day, that the earth was unoccupied, waste, empty, and void of life and beauty of every kind and description. But, before the day had closed, a great change had come over the scene. The desolate and barren earth had given place to our decorated world, clothed in living green, stocked with food, and adorned with fruits and flowers, the beauty and fragrance of which declare the goodness, wisdom and power of the Creator.

To continue the record; verse fourteen:—"And God said, Let there be lights in the firmament of heaven to divide the day from the night: and let

them be for signs and seasons, and for days and years: And let them be for lights in the firmament of heaven to give light upon the earth: and it was so. And God made two great lights: the greater light to rule the day, and the lesser light to rule the night." "He made the stars also. And God set them in the firmament of the heaven to give light upon the earth, and to rule over the day and the night, and to divide the light from the darkness: and God saw that it was good. And the evening and the morning were the fourth day."

Note: The words "He made," are not in the original, but have been put in by the translators, it should read, "the stars also to rule the night."

Here we learn that it was not until the fourth day of creation that the spectator records the first appearance of the sun and moon and other heavenly bodies. "Why did God wait until the fourth day before He made the sun," is a question which has troubled many a mind, and as it has been so hard to explain that many have stumbled and doubted and lost faith in the truth of the record. God on the first day commanded the light to shine and the light broke through the clouds of darkness and lighted up the earth beneath. We believe, in fact it is evident, that our sun was then and had been for ages, the only source of light for our world. Why did it not show itself in its brightness to the spectator on the first, second and third days of creation? Some think it impossible for it not to have done

so, but we know that even now, in this latitude, it is common experience to have a day, or even consecutive days, when there is no sun, or visible appearance of the sun; and yet there is sufficient daylight for all work.

On the morning of the fourth day, the spectator, as he looked toward the east, beheld the bright orb of day in its glory and strength rising above the horizon. The sun, which had been hidden from the earth for a long period of time by the cloud-garment that God had put about it, on this the fourth day, shows His smiling face on the now decorated world, causing it to brighten up and rejoice at His presence.

The sun, the appointed ruler of the day, had his important and necessary work to do for the well-being of the earth and all upon it; and the work, assigned to him for all time, he now begins, by shedding forth his effulgent rays of light, and his warm and life-giving influences, on the newly created world of vegetation; warming into life and imparting strength, vigor, increase and growth to the countless varieties of grasses, herbs, plants and trees which God had created the day before.

As the spectator saw the bright light, felt the burning heat and drying influence of the sun, he would have seen that the tender grasses and plants were in danger of being scorched, and then he would have realized that it was well the sun delayed his appearance until after the tender plants had been created in the ground and had

been given time to take root in the earth. Jesus Christ, in the parable of the sower, says, "The seed sprang up because it had no deepness of earth, and when the sun was up, it was scorched, and because they had no root, it withered away."

The appearance of the sun on the fourth day was timely and good. It was then beneficial to the newly-created vegetable kingdom. Its light, heat and electrical influence, gave life, color, strength and vigor to the new world of vegetation. The law of growth, sustenance and increase in the vegetable kingdom was the same then as now. God at all times has regard to His laws, whether great or small.

There are sufficient reasons here why the sun did not appear on the first day or earlier in the week. If it had been recorded as appearing on the first day, a stumbling-stone would have been moved out of the way of some, but the Almighty would have had to perform miracles or to make other provisions to protect the new kingdom of vegetation from the effect of the sun's heat.

It ought not to be supposed that the appearance of the sun on the fourth day was the first time he had shown his face, lighted, warmed and invigorated with life this world of ours. This earth shows, in the long ages in which it was gradually being formed or built up, especially in the carboniferous period, that the sun had already performed a great, varied and important service, which is not only manifest, but

which we know to have been beneficial in effects beyond calculation.

On this fourth day, the atmosphere being clarified, the clouds dissipated, and while the evening shades began to appear, the moon, appointed to rule over the night, now for the first time showed her mild face to the spectator; and, as he looked above and around him, he beheld a countless number of stars, all new to him, and in his sight, they appeared to be, and are recorded as, new creations.

The record of the day closes: "And the evening and the morning were the fourth day." It is worthy of note that, so far, on one day only does there appear to have been anything new created, and that was the world of vegetation on the third day.

On the first and second days atmospherical changes are recorded. On the fourth day the clouds are dissolved or driven away, so that the celestial bodies, which had been hidden from view, are now for the first time made manifest; and during the fourth day all vegetation and food-supplies were made ready and sufficient to satisfy the wants of all the living creatures which were to be created on the fifth and sixth days.

To continue the record; verse twenty:—"And God said, Let the waters bring forth abundantly, the moving creature that hath life, and let the fowls fly above the earth in the open firmament of heaven. And God created the great sea-monsters, and every living creature that moveth,

which the waters brought forth abundantly after their kinds, and every winged fowl after its kind: and God saw that it was good. And God blessed them, saying, Be fruitful and multiply and fill the waters in the seas, and let the fowl multiply in the earth. And the evening and the morning were the fifth day."

Thus on the fifth day, according to the Mosaic record, fishes were created, together with all living organisms that inhabit the waters; followed by every winged fowl after its kind, birds of graceful form and movement and of beautiful plumage, each with its note of praise. God blessed these living creatures, saying, "Be fruitful and multiply, and fill the waters in the seas, and let the fowl multiply in the earth," promising thus, by implication, that pure air and water and food, necessary for their life and well-being, would be daily provided for them. That the air on the fifth day was in a pure state, adapted for the healthy growth of plants, and suitable for all living creatures to breathe, ought not to be questioned, and also that the waters, in many respects the most wonderful of all the elements, were pure and perfectly adapted to the well-being of all kinds of fish and living creatures made to live in them, and also that they were eminently fit for all animal life and orders of living creatures to use in satisfying the longing of their natures. That, without water, life would be impossible, must also have been evident.

The earth itself bears ample testimony that its

great waters must for ages have performed an important part in preparing the earth to be a suitable habitation for man and all the living creatures who were to occupy it. The waters, in doing their work, must have been impregnated with noxious gases and mixed with metallic solutions and other foreign matter which required ages to precipitate, separate, purify, and make fit for the innumerable uses designed in their creation. This long period of purification was completed before the beginning of the six days of creation, and probably was the period when the earth was covered by the thick cloud of darkness as particularly mentioned in the thirty-eighth chapter of the book of Job.

Genesis i. 24. "And God said, Let the earth bring forth the living creature after its kind; and it was so. And God made the beast of the earth after its kind, and the cattle after their kind, and everything that creepeth upon the ground after its kind: and God saw that it was good."

On the sixth day, as stated, God created the more important orders of beings, all the useful and noble animals now subject to man's use, and all others in their distinct orders and varieties of species, each perfect of its kind, and adapted to fulfill the end designed in its creation.

The Creator, having finished the work of clothing the earth with vegetation and providing food for the many orders of animal life created by Him on the fifth and sixth days, was now prepared to create man, the highest order of all

beings on the earth—man, whom, from the foundation of the world, He had designed to occupy, possess and control all.

The divine record of man's creation is as follows: Genesis i. 26-31. "And God said, Let us make man in our image, after our likeness, and let him have dominion over the fish of the sea and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth. So God created man in His own image, in the image of God created He him; male and female created He them. And God blessed them, and God said unto them, Be fruitful and multiply, and replenish the earth and subdue it; and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth." "And God said, Behold, I have given you every herb bearing seed which is upon the face of all the earth, and every tree in the which is the fruit of a tree yielding seed, to you it shall be for meat. And to every beast of the earth, and to every fowl of the air, and to everything that creepeth upon the earth, wherein there is life, I have given every green herb for meat; and it was so. And God saw everything that He had made, and behold, it was very good. And the evening and the morning were the sixth day." In Genesis ii. 7, we have this further statement: "And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life, and man became a living soul."

Here we have a simple and clear statement of the creation of man; that his body was formed from the dust of the earth, that God breathed into his nostrils the breath of life, and that man became a living soul.

30. *When Did God Create Man, or When Did Man Begin to Live on the Earth?*—A very important question now arises; namely, When did God create man? or, when did man begin to live on the earth? We reply, nearly, or about, 6,000 years ago, according to the chronology of events, from the creation of man to the present time, as ascertained by men learned and qualified for the work, and whose statements are and have been accepted as true by those learned in all the facts of history, and which statements have never been disproved.

That man was the last of living creatures created, is universally admitted. Also, that he is of recent origin, and that "traces of his origin do not reach back to more than 5,000 or 7,000 years ago." Many and strenuous efforts have been made at different times to disprove this leading fact, but they have all utterly failed.

31. *Enquiry into the So-called "Mistakes of Moses." A Challenge to Unbelievers.*—In his record of the creation, Moses is charged with numerous mistakes and blunders; not only in respect to the time occupied in the creative work, but also in the order and extent of the work said to have been created. The question therefore naturally arises, what does the record of the cre-

ative work comprehend?—What does it embrace, and what does it exclude?

The work done on the first and second days appears to be merely atmospherical changes. The air, the atmosphere, that all-important element which surrounds the earth, composed as it is, of the two elementary gases, oxygen and nitrogen, is not mentioned at all as being then created, for in fact, it was, and must have been, created long ages before.

The atmospherical changes of the first and second days were continued to the third and fourth days, during which the beclouded atmosphere was further clarified, its foggy appearance was dissipated, and the clouds, then as now, in a natural way, assumed a more definite shape and appearance, and the water-bearing clouds appeared separate and distinct in the expanse above, from the bodies of water below, when the dry land appeared. But, to the spectator, it seemed as if the water were then and there gathered in their several places, though, in fact, they had been abiding in their watery beds for a long period.

It is recorded that God called the dry land "earth," and the gathering together of the waters He called "seas." But there is no record made that God then created the dry land, or the "earth," "the waters" or the "seas."

In his record, what does Moses have to say about the geological formation of the earth, or what details does he give of the formation of

the earth, or the building of the world from its foundation?—simply nothing. This work, here named, was more important and ten thousand times greater than what he did mention.

As there has been for a long time, especially during this century, such a variety of opinions expressed and published relative to the truth of the Mosaic record of creation, it seemed necessary, before proceeding further, to clear the way, and show wherein the truth of the record lies. This, in the previous pages, we have endeavored to do. But when we state that the creative work recorded to have been done, was done in the time of six ordinary days of twenty-four hours each, the common expressions are "Nonsense! Absurd! Impossible! etc., etc." "If you believe and maintain that as a fact, that alone," many will say, "is sufficient to condemn all your statements, and to make it manifest that they are not worthy the consideration of sensible men."

Therefore, on the question whether the work of creation was accomplished in six ordinary days, as recorded, or in six ages or long periods of time, as many maintain, we ask the attention of all to the following propositions.

First:—That the date or period of time when those events took place, or rather, when man was created and began to live on the earth, was about 6,000 years ago, is a fact conceded by the ablest chronologers of the day, and has not yet been disproved by any ascertained fact.

Second:—That the present solid framework or

crust of the earth must have existed for many ages, practically, as it is not known to be, is admitted by experienced geologists—that is, various formations of rock, veins of ore, deposits of metal, beds of coal, clay and sand, and bodies of water; and also that the arrangement of the continents, many of the islands, the ranges of mountains, the valleys and plains, ocean beds, seas, lakes and channels cut by rivers cut out of the earth as they now exist, give evidence of great age, running into hundreds of thousands, or millions of years, as geologists claim, and the truth of which can be demonstrated by many sure proofs.

Therefore, it follows as an established truth, that when man was created, about 6,000 years ago, this earth was then practically in its geological formation complete, and lacked only the animal and vegetable life which was at that time created upon it.

Third:—That whereas the earth, this solid globe of ours, gives evidence of great age in every quarter of it; and that portions of it are manifestly older than other parts, as geologists affirm; and that, in building up and furnishing this globe with its variety of materials, there were many important and varied processes of operation, occupying long periods of time; Moses, the inspired writer of the six days' work of creation, has said nothing, nor has he in any way attempted to describe, define or explain, any of the circumstances connected with the con-

struction of the earth, or to hint at the period of time occupied in its formation.

Can any one, therefore, with reason, or in justice, connect Moses or his narrative with the work of creating the material earth, or involve him in any of the prevailing world-building plans in which he has had no part?

Fourth:—As the inspired writer of the first chapter of Genesis, in his narrative of events, definitely names each day, its beginning and end, and states what was done, or appeared to have been done each day, as it is all plainly recorded, is it according to truth or reason to impeach his testimony, by asserting, without proof, that the solar days he has so definitely named, are to be construed to mean long and indefinite periods of time?

Fifth:—On examination of the events recorded in the first chapter of Genesis, it will be found that the only things named by the writer as being created on this earth, are the several classes of vegetation, and the various orders of animal life or moving creatures that live in the air, in the water, or on the land.

Now, therefore, is there any work here recorded as having been done, or anything created on the earth, that in any way seems improbable for the Creator to have done or performed in the six solar days as described?

Sixth:—If these things are as stated, and they cannot be disproved, ought not the Mosaic record to be considered literally true, especially in re-

spect to the six ordinary days as named in the narrative?

Accepting the above exposition of the record, there need be no conflict between the scientist and the theologian, for it leaves the geologist free to create or frame the world in respect to process and time as he may find facts to justify him.

Now in reference to the so-called numerous "mistakes" and "blunders" affirmed to have been made by Moses in his record of the creative work as contained in Genesis, we wish to state plainly, in his defence, that Moses does not record or represent that God in the six days created the present solid framework, or so-called crust of the earth, or the earth itself, its mountains and foundation rocks, its beds of ore, veins and deposits of metals, clays, sand, and its various strata of coal, of mineral oil, the water, the air, or any of the gaseous elements, as oxygen, hydrogen, nitrogen, carbon, etc.

Once for all then, we wish to state and challenge any or all unbelievers or doubters of the record, learned or unlearned, to clearly disprove the above statement, which, if they do, then he or they may call on us for the sum of one thousand dollars (\$1,000), which we will pay, provided he or they agree to pay the same amount, if they fail to disprove the said statements; which sum, if and when paid, shall be given to some charitable organization in the City of Brooklyn, N. Y.

VIII

OTHER SCRIPTURAL STATEMENTS

32. *Where are We to Look for Information Relating to God's Creative Work on the Earth?*

—If we are not to look to the Mosaic Record of the six days' work of creation, for some definite information relative to God's creative work in the making of our earth, then where shall we obtain the knowledge we so much desire, and which is so important for us to possess, in order that we may know the truth and find the facts that will inform our minds and guide our judgment to a true conclusion of the whole matter? To this end our efforts are devoted with the hope that we, as well as others, may ascertain and accept such views of the matter as are found to be based on the truth. The question cannot be solved nor settled on any mere theory of the matter. There must be facts, supported by sound reasons, as a basis of accepted conclusions.

There are two sources of information from which we may obtain knowledge to assist us in our inquiry. One is the book of nature—the earth itself—full of known facts, bearing evidence of its part in its history. This book is open for our investigation.

The other source of information that presents

itself to us is the Bible, God's book of revealed truth. Statements of facts relating to God's creative work are scattered here and there throughout this book, which are worthy of our consideration; for they bear intrinsic evidence of their truth.

The earth is here; that we know; for we live upon its surface; this world, where the human race has had its dwelling-place and its recorded history for about 6,000 years. That this earth, so wisely designed, so wonderful and perfect in all its appointments, had a predetermined and definite beginning, ought to be evident to all considerate and reasoning minds. While it is impossible, as stated in the Scriptures, for man to search out and determine the foundations of the earth, yet they also declare plainly that the earth had a beginning, that it was established and "hath a foundation that cannot be moved," and remains in its place in our solar system.

It may be well to quote, as we now do, passages from the Bible stating some of the facts and doctrines therein maintained.

Ps. xc. 2.—"Before the mountains were brought forth, or ever Thou hadst formed the earth and the world, even from everlasting to everlasting Thou art God."

Ps. cii. 25.—"Of old hast Thou laid the foundation of the earth; and the heavens are the work of Thine hands."

Ps. civ. 5.—"Who laid the foundations of the earth, that it should not be moved forever."

Prov. viii. 29.—"Then He (the Lord) appointed the foundations of the earth."

Is. xlviii. 13.—"Mine hand also hath laid the foundations of the earth, and the palm of My right hand hath spanned the heavens."

Is. li. 13.—"The Lord thy Maker hath stretched forth the heavens and laid the foundations of the earth."

Matt. xiii. 34, 35.—"These things spake Jesus, that it might be fulfilled which was spoken by the prophets, saying, I will open My mouth in parables; I will utter things which have been kept secret from the foundation of the world."

Besides the above, there are many other passages from the Scriptures, testifying that the creation of the world was the work of God, and that there was a definite time when He began the work and laid the foundation of the earth.

On these points the Bible speaks with no uncertain sound. Christ Himself, it will be noticed, refers to the foundation of the world as a particular point of time known in the eternal ages.

We give a few more passages of Scripture bearing on the question.

Prov. iii. 19.—"The Lord by wisdom hath formed the earth; by understanding hath He established the heavens."

Ps. cxix. 90.—"Thou hast established the earth and it abideth."

Is. xlv. 12.—"I have made the earth and created man upon it; I, even My hands, have stretched

out the heavens, and all their hosts have I commanded."

Is. xlv. 18.—"For thus saith the Lord that created the heavens; God Himself that formed the earth and made it, He hath established it; He created it not in vain, He formed it to be inhabited: I am the Lord and there is none else."

Jer. x. 10-12.—"But the Lord is the true God, He is the living God, and the everlasting King. He hath made the earth by His power, He hath established the world by His wisdom, and hath stretched out the heavens by His discretion."

Jer. xxvii. 5.—"Thus saith the Lord of Hosts, the God of Israel, I have made the earth, the man and the beast that are upon the ground, by My great power and by My outstretched arm, and have given it unto whom it seemed meet unto Me."

St. Paul writes, in Hebrews iii. 4, "For every house is builded by some man; but He that built all things is God."

These statements taken from the Scriptures, believed by millions to be inspired from on high, give to God the full power and glory of creating the world, the universe, and all therein. They do not divide the wisdom, power and glory of the work with any other being; nor do they in any manner give credit, directly or indirectly, for what we behold in the world and the universe to any natural law, principle or force in nature. God alone is supreme; infinite in His wisdom

and power; the source of all things and the author of all laws.

The earth is declared to have had a beginning, with foundations in the depths below, that cannot be scanned or "searched out beneath" by man. This world of ours bears abundant testimony that it was not made by chance, or formed by operation of laws and forces uncontrolled by intelligent mind and will. But the times, ways, and means employed by God in making the world as it exists, have not been revealed and are as yet hidden from the knowledge of men.

33. *Comparatively at what Age was the Foundation of the Earth Laid?*—The question, however, naturally arises, at what age or period in God's creative work were the foundations of the earth laid? Although the question may not be an important one, it is interesting, at least, to have even a comparative idea of the vast period in which the work was done.

While reviewing the statements of the first chapter of Genesis, we claimed that the first sentence, viz, "In the beginning God created the heavens and the earth," should be, as it was no doubt first written in strict conformity to the facts, "From the beginning God began to create the heavens and the earth," this being the exact truth. As now recorded in Genesis, "in" here implies an act, and not a great work extending over ages. Besides, as now recorded, it implies also that the earth was created at the same time as the heavens, as some seem to have the impres-

sion, both events being named in the same sentence, without distinction, as if it read, "In the beginning God created the man and the woman."

The Scripture quotations which follow make it manifest that God began the work of creating the heavens long ages before the foundation of the world.

In Psalm xc., verse 2, Moses, the man of God, writes,—“Before the mountains were brought forth, or ever Thou hadst formed the earth and the world, even from everlasting to everlasting, Thou art God.”

St. Paul writes of things that God had “ordained before the world began,” and in writing of Christ, Colossians i. 17, declares, “And He is before all things, and by Him all things consist.”

2 Tim. i. 9.—“And grace which was given us in Christ Jesus before the world began.”

Titus i. 2.—“In the hope of eternal life, which God that cannot lie, promised before the world began.”

Christ Himself, in His mediatorial address, declares the fact that the heavens were created long before the foundation of the world was laid.

John xvii. 5.—“And now, O Father, glorify Thou me with Thine own self with the glory which I had with Thee before the world was.”

John xvii. 24.—“For Thou lovedst me before the foundation of the world.”

IX

THE TESTIMONY OF THE BOOK OF JOB

34. *The Book of Job Contains the Scriptures' Most Explicit Declaration of the Foundation of the Earth.*—The passages of Scripture which make the most positive and explicit declarations concerning the foundation of the earth, the particular circumstances and the formal ceremonies attending that important event, are found in the book of Job; especially in the first part of the thirty-eighth chapter, which records a part of the address of the Lord Jehovah made directly to the Patriarch Job. The first seven verses of the thirty-eighth chapter we quote as follows:

1.—“Then the Lord answered Job out of the whirlwind and said,”

2.—“Who is this that darkeneth counsel by words without knowledge?”

3.—“Gird up now thy loins like a man; for I will demand of thee, and answer thou Me.”

4.—“Where wast thou when I laid the foundations of the earth? declare, if thou hast understanding.”

5.—“Who determined the measure thereof, if thou knowest? or who stretched the line upon it?”

6.—“Whereupon are the foundations thereof fastened? or who laid the corner-stone thereof;”

7.—“When the morning stars sang together, and all the sons of God shouted for joy?”

We have here a statement of transactions and work performed, found nowhere else in the Scriptures; and we consider what is here recorded to be of great importance in determining the truth of the questions involved; and as we rest some of our conclusions on these words, we intend to explain them at some length.

As the book of Job has of late years been much criticised and disparaged, and its venerable age denied, some asserting that it was written after the death of Moses, and others denying its verity, and holding that Job himself was a fictitious personage; we have, for these and other reasons, decided to show by evidence, at some length, why the absolute truth of the book should be accepted, Job himself credited as a real person, and full credence given to the statement of facts recorded in the book.

Before the Christian era, so far as is known, there is no evidence that the book of Job was in any way disallowed or discredited by the ancient Hebrew prophets, or the believing people of Israel. The book was accepted as being inspired, and was numbered with the other books of Scripture. All down through the Christian era the book of Job has been accepted as inspired, and Job himself held to be a real character, as represented by the learned writers and investigators of Scripture truth and facts. This has been the opinion, by common consent of Chris-

tians, since the days of the Apostles; but because the Bible does not clearly state Job's lineage, the date of his birth, or the era in which he flourished, critics are inclined to throw doubt upon it, to discredit it as truth, and to deny the facts narrated in the book.

The Bible is the only book from which we can gather facts concerning the events that occurred during the first 2,500 years of the history of the human race on the earth. But that book gives us only a few of the leading facts, such as were necessary to enable man to take his bearings, and learn where he was on the great sea of time; and thus study his condition and the prospects that lie in the ages before him.

The Bible records little or nothing to gratify curiosity. There are thousands of items, concerning persons and events, of which we would like to know more, even down to the period when Christ and His Apostles were on the earth. Such items, if recorded, were not recorded to be preserved and come down to us intact, as God has preserved many special truths, as contained in the Scriptures of the Old and New Testaments.

From the Book of Kings we learn that special care was taken to preserve the history of the times, etc. It is recorded in a number of places, “The deeds and acts, first and last, are written in the books of the Kings of Judah and Israel.” This is written of a number of kings. Of Solomon it is written in 1 Kings, eleventh chapter, “And the rest of the acts of Solomon, and all

that he did, and his wisdom, are they not written in the book of the acts of Solomon." These records are lost to the world, together with more than one-half of the 3,000 proverbs he uttered; and of his "1,000 songs" only a few remain; and only a faint trace of Solomon's description of the nature and character of the vegetable and animal kingdoms of the earth now remains to us. Solomon sent ships to Ophir and Tarshish, which, after three years, returned laden with gold and other rich stores. Many, in these days, would like to know the locality of those places, now lost to the world.

The world, in this age, even the intelligent portion of it, knows comparatively little of the history of the past generations that have lived on the earth. Therefore, the fact that we know so little of the history of Job, forms no real reason why we should reject the truth of the record concerning him.

35. *At What Period in the History of Man Did Job Live?*—The old writers on Scripture history express the opinion that the book of Job is the most ancient piece of writing in the world. This book is singularly unique in its style, character, interest and matter; and also in its importance. Those familiar with it admit there is none like it in the world.

There are many commentators on the Old Testament Scriptures who express the opinion that the Patriarch Job, living in Uz, was a contemporary of Abraham, living in Canaan; and

that the book containing the history of Job's trials and his controversy with his friends, was either written or found by Moses during his forty years of exile in Midian, and was by him delivered to the people of Israel while in the wilderness.

There are several good reasons for not accepting this opinion as being based on any fact or sound reason, so far as Moses' first finding and bringing it to light is concerned. The book of Job was well known to Abraham, Isaac and Jacob, during their lives, and they must have had copies of the same.

The old writers on Scripture history, almost without exception, place the day of the Patriarch Job, or the period in which he lived and had his trial, long before that of the Patriarch Abraham. The learned Dr. Townsend who, in the early part of the nineteenth century, published, in London, a work in six volumes, in which the whole of the "Old and New Testament Scriptures" were arranged in their historical and chronological order, places the book of Job immediately after the eleventh chapter of Genesis, giving it a date of about 2,130 years before Christ.

The following are some of the reasons given by Dr. Townsend for placing the history of Job at that early date, which we quote verbatim from his work.

"The trial of Job is placed before the life of Abraham, on the authority of Dr. Hales. Job himself, or one of his contemporaries, is gener-

ally supposed to have been the author of this book. Dr. Hales' arguments are as follows:

"The silence of this book respecting the Exodus, the passage of the Red Sea, the promulgation of the law, etc., etc., which took place in the vicinity of the country of Job, and which were so apposite to his debate on the ways of Providence, seems to prove that it was written prior to those events.

"Its silence respecting the destruction of Sodom and Gomorrah shows that it was written before that event.

"The longevity of Job places him among the patriarchs which long preceded Abraham. He survived his trial 140 years, and is supposed to have attained to that age before his trial began.

"The manners and customs are exclusively those of pure and ancient patriarchism. He was the priest in his own family, and the institution of an established priesthood does not appear to have taken place till the days of Abraham.

"The very ancient custom of prostration, as a mark of respect, does not even appear to have been known in Arabia in the time of Job. Job was one of 'the greatest men in the east,' yet we do not find this adoration paid to him." See the marks of respect shown to Job, recorded in chapter xxix.

"The most ancient kind of idolatry seems to have been Zabianism, which in the time of Job was regarded with abhorrence, as a novelty deserving judicial punishment." (Job xxxi. 26.)

"Such are the arguments of the venerable Dr. Hales, which have induced me to place the history of the life of Job before that of Abraham. With Dr. Hales, therefore, I have placed the life of Job before that of Abraham, and have supposed him to have lived about the year 2130 B. C. The postdiluvian patriarchs who lived the same number of years, were contemporary with each other. Job is said to have lived 280 years; and it is supposed that his life was prolonged on account of his piety and sufferings. If we allow fifty years for this unusual term, his age will be found to be the same length as that of Serug, the great-grandfather of Abraham, who flourished about this time."

Besides the above, Dr. Townsend names, at some length, other reasons for placing Job's day before that of Abraham, which it is not necessary to insert here, for the reasons already stated are conclusive and sufficient.

36. *Scripture Evidence That Job Was a Real Character.*—But there are some doubters who ask, what evidence have we that such a man as Job ever lived at all. Outside of the Scriptures we have none, and outside of the book itself, Job is referred to, particularly, only twice. But those references are, or ought to be, sufficient to satisfy all doubters who have faith at all in the verity of the Scriptures. The Apostle James, in his Epistle, refers to him thus:—"Ye have heard of the patience of Job;" and sets him forth as an example for all believers. But the clearest and

strongest testimony the Scriptures give us outside of the book itself, is found recorded in the book of Ezekiel, nineteenth chapter. The verses which refer to Job we here quote:—

Verse 12.—“The word of the Lord came unto me, saying,” 13.—“Son of Man, when the land sinneth against Me by trespassing grievously, then will I stretch out Mine hand upon it, and will break the staff of the bread thereof, and will send famine upon it, and will cut off man and beast from it.”

14.—“Though these three men, Noah, Daniel and Job, were in it, they should deliver but their own souls by their righteousness, saith the Lord God.”

16.—“Though these three men were in it, as I live, saith the Lord, they should deliver neither sons nor daughters; they only should be delivered, but the land shall be desolate.”

18.—“Though these three men were in it, as I live, saith the Lord God, they shall deliver neither sons nor daughters, but they only shall be delivered themselves.”

20.—“Though Noah, Daniel and Job were in it, as I live, saith the Lord God, they shall deliver neither son nor daughter, they shall but deliver their own souls by their righteousness.”

21.—“For thus saith the Lord God: how much more when I send my four judgments upon Jerusalem, the sword and the famine and the noisome beast and the pestilence, to cut off from it man and beast.”

Now bear in mind, it was not the prophet Ezekiel that made these several declarations, but “the Lord God”; and He does it not only once, but four different times, the first and last naming separately, Noah, Daniel and Job; and the second and third times saying, “though these three men.” Can anything be more definite that the three men named once lived on the earth, and can any statement be more sure and positive than, “as I live, saith the Lord God”? These statements not only mention Job, his existence and his cause, but also the Patriarch Noah, his faith, and, by implication, the ark in which he was saved from the deluge.

What will the doubters and higher critics do with this evidence? Will they want to take the book of Ezekiel out of the sacred canon, or appeal to some one higher than the Almighty?

The evidence that Job was a real character, and his book inspired, is made conclusive beyond controversy. It is interesting to learn if possible who Job was, and where was the land of Uz in which he lived.

After much investigation and thought, the writer came to the conclusion, more than forty years ago, that Job was no other than Jobab, the thirteenth son of Joktan, who was the son of Eber, who was the great-grandson of Shem. Eber had two sons, Peleg and Joktan. Abraham and the Israelites were the descendants of Eber through the line of Peleg. Jobab was the fifth generation from Shem, Abraham was the ninth.

Jobab, or Job, lived and had the trial of his faith and patience about 2,100 years before Christ. He, Jobab, was the first or original "thirteener" on record. The man Job, considered unfortunate, "poor Job," was, in the end, neither poor nor unfortunate. It is written in Job xlii. 10, "Then there came unto him all his brethren and all his sisters, etc., etc., and gave him money and an earring of gold." "All his brethren:"—this is an evidence that Job was none other than Jobab, who had twelve brothers.

Within a few years we found an old edition of the Bible, in which the book of "Job" was printed as the book of "Jobab," but have lost the memorandum stating when and where published.

Further proof that Job was Jobab, we gather from Stackhouse's "History of the Bible," in which the author states in a note, said to have been taken from the Syriac, that his name (Job) was at first "Jobab," and again writes, "Job otherwise called Jobab."

We have also an old copy, in good preservation, of "Biblia Sacra," in three languages,—the "Graece," "Latine" and "Germanice," printed in Hamburg, Anno Domini MDXCVI. (1596) which says, "Job is said to have lived in the land of Uz, which is on the confines of Idumea and Arabia, and formerly his name was 'Jobab.' The learned Dr. Adam Clark, in his commentary, makes practically the same statement as the above.

Another important statement we have, through the favor of the Librarian of the Lenox library of New York, who writes that the Septuagint Bible, in the original, and also in its English translation, states in a note, "This man, Job, is described in the Syriac book, as living in the land of Ausis, on the borders of Idumea and Arabia, and his name before was Jobab."

These several statements, and a number of others by various commentators, appear to derive all their information from the Septuagint version of the Scriptures; and the note there mentioned points to Jobab, a king of the Edomites, son of Zerah, descended from Esau, (see Genesis xxxvi. 33, 34) as being the Jobab or Job of Scripture.

Just here, we believe, is where the blunder has been made, and where students of the Scriptures have been led astray. This Jobab of the line of Esau, the idolatrous and corrupt Edomites, bears no sort of resemblance to Job of the Scriptures, either in length of days, nor the age in which he lived, nor in character or surroundings that are at all descriptive of the persons contemporary with the Patriarch Job, or the times in which he lived. In the Jobab of Esau, there is no analogy in any respect to the Job of Scripture.

37. *Where was the Land of Uz Where Job Lived?*—But there is one fact brought out in this old version of the Scriptures that is important and should have definite attention, and that is:—this so-called Septuagint, being a Greek version

of the Hebrew Scriptures, was made by seventy learned men appointed thereto about 270 years before Christ, which version has a higher reputation than any other, and was frequently quoted by Christ Himself. This acknowledged and authorized book of the Hebrew Scriptures has, at the end of the book of Job, written at the time, this note:—"This man is described in the Syriac book as living in the land of Ausis, on the borders of Idumea and Arabia, and his name before was Jobab."

If the name of the Job of the Scriptures was formerly Jobab, which the above statements prove, then there is no reason to believe that the real Job was a descendant of Esau, but the best of evidence that he was the Jobab of Joktan, and grandson of Eber, as before stated.

"There was a man in the land of Uz whose name was Job." (Job i. 1.) It has been a question for 1,000 years and more, where was the land of Uz in which Job lived? Uz was the son of Aram, who was the son of Shem, who was the son of Noah. The land where Uz lived was doubtless the land of Uz. In what part of Western Asia did it lie? Commentators have been at a loss to locate the land. Diodati, assisted by many learned men, published, in 1657, in two large volumes, his "Annotations of the Bible." In the preface to the book of Job, it reads, "Though our maps cannot show us what Uz was, or where situated, yet cannot this Scripture of Job be rejected."

The name of Uz given to the land passed away comparatively early, and was forgotten by succeeding generations. Even Moses, in his day, does not use it, calling the land of Uz, Edom, or the land of the Edomites, children of Esau. This is another incidental proof which cannot be denied, that Job lived long before Moses.

A few years since, while reading again in "Lamentations," we learned unexpectedly where the land of Uz was situated, and that beyond doubt. It is found in Lamentations iv. 21 as follows:—"Rejoice and be glad, O daughter of Edom that dwellest in the land of Uz."

The Genevan Version, a copy of which we have, printed in 1560, has precisely the same translation of the verse. Another old version has it translated thus:—"Be joyful and glad, O daughter of Edom, who dwellest in the country of Uz." Now we hold this to be evident proof that the land of Uz was afterward, even before Moses' day, called Edom, from Esau.

It is seldom that the Bible goes out of its way to gratify curiosity, but here it would seem that the Prophet Jeremiah was led by the Spirit to record the fact that the land of Edom was formerly the land of Uz.

In the days of the old patriarchs, before Abraham, the land of Uz was well known; and that was the time when Jobab, son of Joktan, lived; and he, doubtless, was the Job of Scripture.

It is not certainly known who wrote the book of Job, and when and how it came into the pos-

of the Hebrew Scriptures, was made by seventy learned men appointed thereto about 270 years before Christ, which version has a higher reputation than any other, and was frequently quoted by Christ Himself. This acknowledged and authorized book of the Hebrew Scriptures has, at the end of the book of Job, written at the time, this note:—"This man is described in the Syriac book as living in the land of Ausis, on the borders of Idumea and Arabia, and his name before was Jobab."

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session of the Israelites, though many learned commentators have inquired into the matter, and some have named eminent persons as being its author, stating reasons for their opinions.

38. *Who Wrote the Book of Job?*—With the exception, perhaps, of the first chapter and part of the last, we believe that Job himself wrote the book. He lived long after the trial, and had sufficient time to do it. He best knew all the circumstances, and had a vivid recollection of the same. He was truthful, and had the ability to do it, as is manifested by the force and strength of his arguments in defence of his integrity, and the ways of God with man.

It has hitherto been a favorite, and perhaps the most plausible theory, that the book of Job was the first brought to the knowledge of the Israelites by Moses, who found it in Midian, east of the Red Sea, during his exile of forty years from Egypt; but this is a mere supposition, not sustained by any proof. The land of Uz was far north of Midian, and Jobab of Joktan flourished 400 years or more before Moses; so it is not at all probable that Moses found the book in Midian. For many years we have had the conviction that Melchizedec, that mysterious and wonderful man, had the book of Job in his possession, and presented it first to the Patriarch Abraham.

By an incursion of some petty kings into the land of Canaan, the king of Sodom and others, including Lot and his family, were carried away captives. (See Genesis, chapter xiv.) Abraham,

on hearing of the affair, gathered 318 of his trained servants and pursued the enemy and delivered Lot, his family, and others. For this he received the thanks of the rescued. "And Melchizedec, king of Salem, priest of the Most High God, brought forth bread and wine;" symbols of the Christian faith. "And he blessed him and said, 'Blessed be Abram of the Most High God, possessor of heaven and earth. And blessed be the Most High God which hath delivered thine enemies into thine hands.'"

This ought not to be considered any mere formal blessing on the part of Melchizedec, no mere "thank you, friend Abram, for risking your life and the lives of your servants, and the self-denying efforts you have made to deliver this people, their lives and property;—very kind of you to do all this." It was far more. Abraham was a man chosen of God to be head of the church, the children of faith; and through whom He was to accomplish great purposes. God had a great work for him to do, and Abraham must be prepared for that work. Melchizedec was a "priest of the Most High God," and he had his part to perform. He "brought forth" the elements of the "bread" and the "wine," and he and Abraham had sweet converse and communion together, no few hours or days, perhaps seven at least, in that age of deliberation, so manifest to any one reading the book of Job.

39. *Who Introduced It to the Patriarchal Church?*—Melchizedec, (the prototype of Christ,

as St. Paul writes in Hebrews) doubtless had this book of Job, containing its many important and valuable truths, to present to Abraham to confirm and establish him in the faith. The book may have been revised by Melchizedec himself. He may have written the first two chapters, and the last one. He may even have had one of the fair daughters of Job for his mother. Doubtless David and the old prophets, also Paul, knew more of Melchizedec than the Scripture records would lead us to infer.

Job's patience was greater than that of any other man who ever lived; but greater than his patience was his faith. All the trials that Satan brought to bear upon him did not shake his faith. He never distrusted his God. Job said, "Though He slay me, yet will I trust in Him." He declared, "I know that my Redeemer liveth, and I shall see Him for myself and not another."

The perusal of the book of Job by Abraham, in the many years of his long life, reading the arguments, pro and con, as advanced by Job and his friends, and contemplating the beginning and end of Job's trial, and the address of the Almighty Himself to Job, must have greatly strengthened Abraham's faith.

In the days of sore trial of prophets, priests and believers, before and after Christ, the trial of Job's faith and patience has ever been to them like a foundation rock, imparting faith and courage to endure to the end.

Was not the hand of God in the work of de-

veloping the character of Job, and the giving of the history of his trial to his people, intended as an example of faith and patience to His people in all future generations? When the great trial of Abraham's life came, and he was commanded to slay his only son, Isaac, he was enabled like Job to say, "Though He slay me, yet will I trust Him." The Lord Jehovah never ceases to care for His Redeemed.

As Abraham possessed the book of Job, as we believe, he doubtless made copies of the same for the benefit of his children and grandchildren, and even for presents to important personages.

Abraham was a man of wealth and culture. He had his flocks and herds, his gold and silver. In his fight with King Chedorlaomer and others, he brought out the "318 servants born in his own house"; which, old commentators state, implies that he must have had at least 1,500 servants in his household. Abraham looked well after his affairs and accounts, and undoubtedly had the ability to write.

Flavius Josephus, in his history of the Jews, writes, "Abraham conferred with the Egyptians," . . . "and he was admired by them in these conferences as a very wise man, and one of great sagacity, when he discoursed on any subject he undertook; and this not only in understanding it, but in persuading other men also to assent to him. He communicated to them arithmetic, and delivered to them the science of astronomy."

Abraham, in his contest with the kings, and in rescuing the prisoners and their property, did it all at his own risk and expense, declining to take the least thing for compensation when it was urged upon him for his good work. This shows his honorable spirit, and that he was a gentleman; the first recorded in history. His son Isaac, a quiet gentleman and model husband, doubtless also practiced the art of writing, and, in his years of leisure, probably made copies of the book of Job for his sons Jacob, Esau and others. Esau, naturally disinclined to Job and his ideas, sided with the views of his so-called friends, and for that reason called his firstborn son Eliphas, after Job's principal opponent.

40. *Esau Settled in the Land of Uz, and Afterward it was Called Edom.*—Esau also in his effort to get away from Jacob, moved into the land of Uz, and took possession of it for himself and his posterity; and afterward Uz was called Edom. As a matter of course it was very natural that many of the old names in the book of Job, and once familiar in the land of Uz, would be repeated, as they were, even that of Jobab, afterward one of the kings of the Edomites.

The book of Job has always been a source of inspiration to the old patriarchs, prophets, priests and kings. The revelation it contains of God and His ways, has strengthened the souls of His people. Moses, David, Solomon and others have drawn lessons from the book.

Many of the facts concerning Job, Melchizedec,

and others, were doubtless once well known to the Israelites, but like thousands of other facts relating to well-known kings, recorded at the time, as stated in the books of the kings, are now all lost to the world.

Our readers must pardon us for this long digression from the work of creation, that we might consider facts concerning the book of Job. As the facts stated in that book relating to the foundation of the earth are the corner-stone of our theory, so far as it relates to revealed truth, of the beginning and the formation of the earth; it devolved upon us to establish the truth of the reality of the person of Job and his history beyond reasonable doubt, especially as, in these days, many people profess to believe Job to be a fictitious character.

X

THE PROCESSES EMPLOYED IN THE FORMATION OF
THE EARTH

41. *What Were the Processes Probably Employed by the Creator in the Formation of the Earth?*—The next important question is, what were the processes probably employed by the Creator in the formation of the earth?

The theory we hold is that, so far as the material of the earth is concerned, it was, at its beginning, atomic in its nature and character; and that also, in the subsequent development or building up of the earth, the material was delivered, not in any solid form, or combination of varied classes of atoms, but in its atomic form. Also, that the nature or class of atoms used at any particular period in the history of the formation of the earth, from its beginning to its end, were definite in their nature and character; being such, with their necessary combinations, as were predetermined by the Creator Himself, after the same manner as skilled architects now decide, determine, and adopt, in any important building they may be erecting, viz:—describing and defining all the materials, and when, where, and how they are to be used and applied.

42. *Were the Comets Employed in Delivering*

The Formation of the Earth 137

Material for the Formation of the Earth?—The next question is, how were these atomic materials brought and delivered to the place where the earth was being formed? The great and wise Creator, who provides the way as well as the means, certainly had a definite plan for performing the work.

After considering the matter now and then for years, we have come to the conclusion that the Creator has used, and is still using, that class of celestial bodies well known to exist in very great numbers, and which are constantly moving through space in our solar system, called the Comets. They exist in great variety as well as in great numbers, differing in size of nucleus or head, in their train, in their appearance, in their substance, or atomic or gaseous material, in velocity of movement, in form of their orbits about the sun, and in many other ways. The nucleus of one comet may have an affinity for oxygen, another for hydrogen, another for carbon and other gaseous or definite atomic materials.

The great comet called "Donati's Comet," which appeared in 1858,—at that time the wonder of the heavens,—had a train said to have been over 50,000,000 miles long, and many millions wide; and this train was declared, by those competent to judge, to be composed principally of hydrogen gas.

Experts in this branch of the science of astronomy, by the use of the spectrum, have decided that the majority of the comets of late

years are composed of carbonic gas. While comets are believed to be obedient to the laws of gravitation, yet they are very erratic in their courses, and mysterious in their nature and service. Whenever they have made their appearance in ages past, they have been the dread of mankind; but, so far, it is not on record that they have hurt or damaged our planet in the least.

The angels in charge have had them well in hand. Astronomical works state that there are nearly 10,000 comets registered as having made their appearances, the majority of which, as far as it is known, have never returned.

Kepler states that comets may be numbered by the million, and other astronomers agree with him in this matter. Some comets fly from one sun to another, in all directions; ever keeping their tails or trains away from the sun as they approach or fly away from that body. "These mysterious bodies are the couriers of the sky," celestial transports, and the messenger cars of the universe, that perhaps, among other uses, do service as transports for angels or spirits from one system to another. Comets certainly were not made in vain; but doubtless for some good object, for that is the end and purpose of all God's works.

The comets may be, as we believe and have before stated, the world-building cars of the Almighty, transporting and delivering the desired atomic material when and where needed in the

process of the formation of any planet-world or other celestial body.

Some of them have been, and even now may be, employed, as we might say, as the scavengers of our solar system; each one attracting and gathering up all the stray elements found floating in space, that have been thrown off or parted from some of the celestial bodies passing through space; some comets having a special affinity for one atomic or gaseous element, and others for some other particular element. That some such stray elements do exist, as are represented by the shooting stars, showers of meteors and star-dust, which the earth, in its annual course about the sun, is known to pass through, is evident.

Flammarion, in his "Popular Astronomy," states on page 74, "that the shooting stars which continually fall on our earth are more than 100,000,000,000 per annum." This statement must be exaggerated; if true, it would at least affect our eyesight. All the planets and their satellites, besides the great sun, doubtless hourly part with a large quantity of diffused atomic or gaseous materials.

The hydrogen gas of our earth, the lightest of all gases, that is rising continually to the upper and outer regions of the atmosphere, and on which gravitation has little or insufficient influence to counteract the rapid rotation of the earth, floats away from it into space and is afterward gathered by some of the comets having a special affinity for that gas.

Under these circumstances, and in such a condition of things, it appears that the comets perform a useful and necessary work by gathering all floating derelicts or fragments of elements lost in space, and by this means clarify the solar system.

43. *The Comets best Adapted for the Service.*

—The skilled architect, when called to design and erect a large building for art, literature, legislative or other public purposes, aims first to have it perfectly adapted to meet all purposes and requirements for which it is intended; that its foundation shall be sure; that all the materials selected and used in every part of the structure, from its foundation to its topstone, shall be not only substantial and suitable in every respect, but such as shall add beauty, dignity and character to the completed building; thus earning for himself not only renown, but the gratitude of the public he has nobly served.

If an architect, endowed with wisdom and power, was called upon to construct a world after the model of our earth, what could he desire more, or find better adapted to his purpose, to enable him to accomplish perfectly the work he had in hand, than the service of the "flying comets"—"the celestial transports" to bring him the desired materials from near or far, and deliver the same just when and where desired in automatic fashion?

44. *The Orderly Way in Which Earth's Strata are Laid Bears Evidence of the Service of Comets.*

—The various strata of the earth, and the orderly manner in which geologists find the strata laid in its formation, prove that the material was deposited in some such regular and orderly manner. We may rest assured that the body of the earth is no heterogeneous mass of material, or conglomeration of the elements thrown off from some other body. It is plain that no such deposition of material could have been made on the earth under or by the revolutionary process of the Laplace Nebular Hypothesis.

Admitting that the comets were used in the process of building up the earth, and that, in that service, they were operating under natural laws, it is conceded that their services were not performed under any general law, but were made by special act and superintendence to accomplish the end first designed. This is where the majority of the scientists of this day will object and deny, who believe only in known and general natural laws, and will not admit of any special acts of the Almighty or His appointed agents in any creative or other work that has been performed.

45. *The Earth Formed by the Special Acts of the Almighty as well as His General Laws.*—We hold to the doctrine that the world in its creation, many ages since, from its beginning and during all its physical history, and also since man has occupied it, has at all times been subject, not only to the general laws of the Almighty, but also to the special decrees, acts or appointments

made and executed by Him at various times, or by His agents as directed by Him. "He treasures up His wise designs, and works His sovereign will."

Our world is a progressive one: so also is the universe. It is not expected that the Almighty would make or declare all laws at once, or at any one period, to suit all coming exigencies. A physical change may yet come over all things, as predicted. But principles are different from physical laws: while the latter may change, principles do not, for they are eternal.

But in this matter of the manner of the ways and means used by the Great Creator in the formation of the earth, the question whether the Almighty used the comets or similar methods for accomplishing the great work, or whether He created the material there and then on the spot as the work progressed, or by some other proceedings to us unknown, is not, in our inquiry and investigation, a vital or important question. Although we believe in it as stated, we do not build upon it. "God's ways are past finding out." His resources are beyond the comprehension of finite minds.

That the earth had a beginning is not to be questioned. That it had also a predetermined, definite and orderly beginning, we believe must be evident to those who will consider the matter, observe what was done, and admit that God was its "Maker."

The science of astronomy gives us only a com-

paratively faint idea of the extent of the universe. It is infinite; far beyond our comprehension, in every respect. The telescopes of this century have brought to light millions of stars that are not visible to the naked eye. These stars are known to be suns, like the one that rules our solar system, having in all probability planet worlds revolving about them like our own sun.

In view of such an infinite number of worlds in this great universe, we naturally get the idea that their creation must be a matter of common occurrence on the part of the Creator, and of no special importance or significance; and that therefore our earth must be included in the same list, and its creation held to be, by intelligent men, of no particular importance. So far as nature teaches us, this idea would be correct, and it is held so to be by many an astronomer, and the scientific world generally.

46. *The Definite Importance of Our Earth in its Creation.*—The Scriptures, however, give an entirely different impression, and from what they teach, we are led to believe that the creation of our earth was one of the important events in the history of the universe.

At a period in the history of the universe, appointed by the Almighty, He prepared to lay the foundation of the earth, to make a beginning of the creation of a new world in which, at a time appointed and known to Him, important and controlling events would transpire that in the

ages to come would enhance His own glory, and in a greater or less measure advance and confirm the peace, security and felicity of all His intelligent creatures, not only in our world but in all other worlds.

"Known unto God are all His works from the beginning of the world."

In view of the far-reaching and eternal importance of the events that were to be, and that have since transpired on the earth, one would reasonably expect that the beginning of its creation would be noted by some definite recognition or marked ceremony of the great event; and this was truly the case, as we learn from the statement of the event and the circumstances connected with it, found recorded in the book of Job, chapter xxxviii., from first to seventh verse inclusive, which we here repeat as follows :

1.—"Then the Lord answered Job out of the whirlwind and said,"

2.—"Who is this that darkeneth counsel by words without knowledge?"

3.—"Gird up now thy loins like a man; for I will demand of thee, and answer Me."

4.—"Where wast thou when I laid the foundations of the earth; declare, if thou hast understanding."

5.—"Who hath laid the measures thereof, if thou knowest? Or who hath stretched the line upon it?"

6.—"Whereupon are the foundations thereof fastened? Or who laid the corner-stone thereof;"

7.—"When the morning stars sang together and all the sons of God shouted for joy?"

This brief statement of events by the Lord Jehovah to His servant Job, makes it evident that there was a definite and marked ceremony at the beginning of the creation of the world, known to the angelic host, in which ceremony they had an honorable and joyful part to perform, "when the morning stars sang together and all the sons of God shouted for joy."

From this declaration we have reason to believe that the beginning of the creation of the world, so far from being an ordinary event in the works of God, was, from the circumstances attending it, and the important fact known to God, that the world would be, as it has been and even now is, a conspicuous theatre of events of universal importance, by and in which are developed and manifested the glorious attributes, the wisdom and counsel of God in His moral government of the universe. Also that, in the fullness of time, or the ages to come, might be made known to all intelligent beings, the intent of the Almighty, to unify, perfect, establish and bless in and through one, that is His Eternal Son, all intelligent beings in the universe.

The scientist, analyst, or chemist examines, discovers, tries and tests the nature and character of the elements that are brought to him for investigation; and determines their varied properties, uses and value; all of which necessary and important work is performed in his small labora-

tory, though his work may be of world-wide importance and benefit to man.

So it would appear, from the testimony of the Scriptures and the history of man on the earth, that there has been developed on this little planet, our world, a purpose of the Almighty to try, test, make known and establish, the wise, righteous and holy principles of His divine nature and government, for His own glory and the benefit of the human race, as well as for the confirmation of the fidelity, peace and happiness of all intelligent creatures in the wide universe.

47, 48. *The Laying the Foundation and Corner-stone of the Earth Was an Imposing Ceremony. The Honorable Service Appointed For the Angels.*—The oldest event relating to the history of the world is that of laying its foundation and corner-stone, the first record of which together with the ceremony attending the event, is found in the thirty-eighth chapter of the ancient book of Job.

The Almighty, in His address to Job, demanded of him to declare "Where wast thou when I laid the foundations of the earth? Who determined the measures thereof? Or who stretched the line upon it? Whereupon were the foundations thereof fastened? Or who laid the corner-stone thereof, when the morning stars sang together, and all the sons of God shouted for joy?"

Just what was the process or manner of laying the foundation or the materials used, none but God and the angels know. That no man in this

life will ever know, we infer from the declaration God made to the Prophet Jeremiah thus recorded, "Thus saith the Lord, If Heaven above can be measured and the foundations of the earth searched out beneath, I will also cast off all the seed of Israel for all that they have done, saith the Lord." That the proceedings and ceremony brought into service on this most august occasion were appropriate, orderly, grand and magnificent beyond our conception, must be evident; for God and His angels were the holy persons engaged in the important service.

At the grand scene there were doubtless angelic representatives from the various principalities and powers of God's universal kingdom. Angels and archangels, the cherubim and seraphim were there, in all their beauty and glory; taking part with joy in the new work God was pleased to inaugurate.

The regular and constant interposition of angels, endowed with wisdom and power, in performing the work God had given them to do, and in the maintenance of His government, is a doctrine abundantly sustained by Scripture. In the book of Revelation it appears that all, or nearly all, of God's governmental acts are in charge of the angels, or are superintended by them.

If, in the divine economy of God's government, He created spiritual beings, and endowed them with great wisdom, power and rectitude; of which there is abundant evidence in Scripture,

and no reason to doubt the same; it is only reasonable to suppose that He would use the abilities thus conferred upon them in His creative works, and in the orderly maintenance of all the celestial bodies in the heavens. They are also His ministers to do His will, to establish His kingdom and authority, to execute His decrees, to administer His laws, and in the bestowal of His gifts. God has created them for good and wise purposes. Why should He not use these, His most faithful servants, in His glorious works, conferring on them complete happiness, glory and honor?

The Lord Jehovah demanded from Job an answer to these questions: (see Job, chapter xxxviii.) "Who determined the measure thereof, if thou knowest? Or who hath stretched the line upon it? Whereupon were the foundations thereof fastened?" We infer that the measure of the earth, its size and appointments were all determined from the beginning. Doubtless the angels of God "that excel in strength, that do His pleasure, hearkening unto the voice of His word," at His command stretched the line from pole to pole, laid the corner-stone, and established the foundations of the earth, so that they cannot be moved.

What these foundations were, and how established, no man knows. Most assuredly the work was perfect: nothing was left undone that should have been done, for the workmen were without fault.

49. *The Probable Process of the Formation of the Earth, Occupying an Age or Ages.*—When the foundations were laid, we may reasonably infer that the earth began to be formed, to grow and increase in size from age to age. The material forming the body was added to it when presented. The earth or its nucleus revolving rapidly, receives and appropriates the material as the fast revolving spool takes the yarn from the skein held by the retaining shaft, that also turning. The nucleus of the earth turning rapidly would absorb the atomic material forming the train of the comet for which it had an affinity, the material effect of which would be to compel the comet also to revolve about the earth's nucleus, drawing it nearer and nearer until the end of the yarn, or the atomic material of the comet's train was exhausted.

The spool or ball taking the yarn after this fashion, has it distributed equally on all sides, not lopsided, or one side being heavier than the other. So, therefore, the atomic material from the various comets' trains in succession being fed on the revolving nucleus of the earth, as we have indicated, the growing earth would be built up gradually and uniformly on all sides, being like the well-balanced wheel in the clock, in the engine, or wheels and shafts in perfected machinery. We cannot conceive of a more practical or perfect way of forming or building up a body like our earth than on the plan of procedure here named.

To say the least, it was an orderly proceeding; allowing the Creator full opportunity to take or deliver at the proper time, the right material as the work was progressing, coherent atoms adhering compactly with materials previously deposited.

After such a process as this, in all probability the earth was gradually formed and built up to within, say, eight or ten miles of its present surface.

That the atomic material was cohesive in its nature and compactly laid, is evident from the specific gravity of the earth, which is about six times greater than that of water, which is much heavier than the present surface of the earth as far down as man has been able to test its specific gravity, for the known rocks on the surface of the earth do not average more than three times that of the water.

The period of time occupied by the Creator in reaching that distance from the earth's centre, no man knows. To attempt to name the ages that passed would be mere guess work; for man has no data on which to form an opinion.

The deepest hole man has been able to dig or bore in the earth below its surface, we learn, is less than a mile and a half.

The mountains that have been forced up above the surface of the earth, tell the story of what is below far better than anything else the world can exhibit to those who live upon it.

50. *The Creator had Definite Designs in the*

Formation of the Earth.—From what we are able to learn from nature about us, below and above us, we reason that God has a design and purpose in all His plans, which purpose is being gradually developed in all His works.

We are not able to perceive any reason why there may not be or have been, practically, a uniformity of procedure, and perhaps a similarity in the material used, from the foundation of the earth to within a comparatively few miles of its surface.

But after observing and considering the face of the earth, as it is known to exist, the varied conditions of its material, as well as the variety and classes of its simple elements, the changes they have undergone, the plan of its distribution, whether of solids or fluids, we notice that there was or must have been a necessity for a change, not only in the distribution of the material, but an increase in the variety of the nature of its atomic elements, so that now diversity, and not uniformity, must have been the rule; and that everywhere there must have been a certain adaptation of material things to time, place, condition and circumstances, to meet the requirements of the predetermined plans of the Creator.

When the formation of the body of the earth was nearing its completion, it is to be supposed that the all-wise Creator would now specifically prepare it for the grand end He had in view from the beginning of its creation; that it should be richly endowed with all the necessary materials

required in all future times to meet the wants and add to the comfort and happiness of all who were to occupy it, together with all the facilities required to utilize all the elements bestowed.

Therefore, whatever additions were called for and were now to be made to the earth's surface, must be definite in their character and suitable for the purposes to be accomplished.

The period had arrived in the formation of the earth when it was necessary to plan or provide for the face of the habitable globe. God, who so fashioned the head and face of man that no artist will venture on, nor even suggest, an improvement, has also fashioned the face of the earth in accordance with His wise designs.

XI

THE AQUEOUS AGE

51. *Importance of the Law of Affinity.*—In the arrangement of the continents, islands, ranges of mountains, valleys, plains, beds of the oceans, seas, and lakes, and the channels cut out of the earth for the rivers, is manifested by the Creator a definite and wise plan to perfect the earth and make it habitable and comfortable in the highest degree for man who was to occupy it.

Six to ten miles, more or less, below its present surface the earth, may be said to be the primitive, unchanged and solid foundation of the earth. What was formed above these lines may be called the "crust of the earth."

By what process were the continents formed?

According to our theory, the earth was built up by successive additions of selected material delivered to it, and for which there was a natural affinity. Now that the continents were to be built up high above the oceans' beds, there was a necessity that the material forming the continents should be delivered to those parts of the earth appointed to receive it, and not on other portions where it was not wanted; the world itself affording proof that this was done. Here again do we see the utility, if not the necessity, in the world

and universe of the great principle of affinity, and vice versa, in materials.

As we have before intimated, affinity is a law of the universe. The poet writes, "Order is Heaven's first law." Does not affinity precede order, and order in many respects agrees with, and is maintained by, natural affinity; or, in other words, mutual attraction.

If the skilled artisan or chemist, in electro-plating and other similar processes, cover the parts not intended to be plated, or treated with a protecting material, so that the electro-plating solution is deposited only where desired, why may not the Almighty in His works take advantage of the methods found so useful by His creatures, and thus provide that new material for the earth shall be added only where designed.

But besides the process here named of building up the continents above the present level of the oceans, doubtless there were many other effective methods and processes in operation during the long periods in which the earth was passing through the several important stages of its history, wherein were developed and prepared materials of inestimable value to those who were to live upon the earth; a fact now abundantly made manifest.

Man at this age of the world is not competent, or has not the evidence at hand to enable him to decide what means the Almighty used to build up the world. We draw our conclusions from what we observe and learn from His works and ways.

52. *The Relative Proportion of Land and Water on the Surface of the Earth.*—In reference to the relative quantity of water and land on the globe, we make a few extracts from the writings of Professor Dana, the well-known author of standard works on Geology and Mineralogy, etc.: "There is nearly three times as much water surface as land surface, the relation of water to land-area being $2\frac{3}{4}$ to 1. The average depth of the sea is 13,000 feet, the average elevation of the land being 1,000 feet. The ocean then is thirteen times as deep as the land is high, and has a surface area of $2\frac{3}{4}$ times as large as that of the land. If we assume that the ocean beds, at some former time, formed continents, a depression of 14,000 feet would have been necessary to bring about the present condition of the earth. Likewise, had the continents formed the sea-bottom, an elevation of 14,000 feet would have been necessary to bring them up to the present height, but no known geological agents are able to perform such work."

We do not at all believe in the molten condition of the earth, nor in its consequent theory of contraction in cooling, one of the effects of which is claimed to be the elevation of the mountains.

The surface of our planet exhibits a great variety of materials, in fact, all the known simple elements, together with the endless variety of combinations that constitute the body of the earth as far down as man has been able to investigate.

So far, "The deepest hole that has been bored into the earth on record," as stated lately in a scientific publication, "was one of 6,571 feet below the surface of the soil, made at Parnschwitz, in upper Silesia." "The previous record for depth," says the *Scientific American*, "was the 5,753 foot hole drilled some years ago near Leipzig. The later hole was made in search of coal measures, many separate seams were penetrated, some of considerable thickness." The paper states, at some length, the great difficulty experienced in boring down to the first level mentioned, finally leaving the heavy steel tools used below, lost beyond recovery.

53. *The Definite Character of the Atomic Elements Forming the Surface of the Earth May be Ascertained.*—Whatever may have been the definite atomic materials deposited in the early stages of the formation of the earth, whether few or many, it is evident that after the final completion of the earth up to, say, six to ten miles below its present surface, there must have been delivered upon it all the simple elements known to exist, and they were delivered, or caused to be delivered, by the Creator in such proportions and at such places as finally to produce, by the operation of the causes set to work, the effects and results that now exist, or have existed, at or near the surface of the earth. Geological facts prove that the various strata of rocks or elements on the face of the earth were laid in order as designed.

Emerson writes: "For the world was built in

order, and the stones march in tune." Yet notwithstanding the orderly deposition of the various strata of material, there have since been causes at work of immense and irresistible proportions, that have broken up the face of the earth; and, even for miles down, the various strata of rock or materials have been turned up at all angles, even perpendicular, and folded over. The causes were not only mechanical action, but also chemical and electrical action, with all the varied and tremendous results that those forces imply or can produce, in any and every direction. New materials and combinations of materials beyond our comprehension have been irresistibly formed by the operation of these united forces of nature.

54. *The Element Electricity Considered.*—Before proceeding further in relating some of the possible processes in the earth's formation, it may be well to call attention to that wonderful, mysterious, all-pervading, and all-powerful element, Electricity; that subtle, inscrutable element, of which it may be said that no one knows wherein its power lies, nor the extent of its influence, nor can we comprehend the rapidity of its movements nor realize that we all live in its presence, and are indebted probably to its influence for our very life.

During all the centuries previous to the nineteenth, electricity in its various manifestations has been the dread of mankind; but in this century, particularly in the latter part of it, our

investigators have so far mastered it that they have made it to be their "servant of all work."

We will not say that electricity did not have some work to do in the formation of the earth, from its very foundation, but as it was not apparent, we have not mentioned it. But, during the period when the surface of the earth was being definitely formed, built up, and supplied with requisite material, the period we are now considering and endeavoring to explain, it must be apparent to the geologist, the chemist, and all students of nature, that electricity and its influence must have pervaded the elements in the past as it does at the present.

The various elements of the earth at this formative period, would, by their movements, conditions, forced and rapid changes, often in large masses, causing much friction and consequent heat and other effects, develop and generate an inconceivable degree of electricity, producing many of the conditions known to exist, or that have existed.

But this element, electricity, and its sister, magnetism, like all other elements God has made, are subject to law; and, like water, they have special and definite laws controlling them.

The Almighty in creating man, so fearfully and wonderfully made, placed under his skin, at a safe distance from the surface, the arteries carrying the largest portion of the blood; and then, the innumerable veins, decreasing in size as they neared the outer surface, all filled with

the precious life-giving fluid, ever flowing on, whether man was awake or asleep, making and preserving him a living creature through scores of years. In the same manner this useful, important, and wonderful element, electricity, now coming into prominence in respect to its value and service to man, is, like light and heat, generated in the sun, and flows from that body to the earth; and so pervades the atmosphere and the earth that it cannot be exhausted, any more than we can exhaust the air; yet its peculiar nature is such that conduits are required for its service, as streams and rivers are needed to distribute the rains that fall upon the earth.

It is not reasonable to suppose that the Creator, who is a God of law and order, would leave this important and all-powerful element in a disorganized condition, not subject to orderly control.

Although the earth is a good conductor, giving and taking these elements from the skies, yet we believe there may be a few miles below the surface, less than ten, a complete and established system of electric conduits and conductors, large and small, running from pole to pole, through which electric currents are continually passing, being replenished from that vast electric body, the sun. Some reasons in support of this opinion we will state later.

55. *Electricity's Brother Magnetism.*—In regard to magnetism, what appears to be a fact and law in respect to that element, we quote from a work on electricity. "Let it be under-

stood that a wire or any conductor having a current of electricity passing through it, has lines of magnetic force, passing one way around it; and the number is in direct ratio to the quantity of the current passing through the wire."

This being an ascertained fact, is it not probable that the magnetic currents passing around the earth, at right angles to the electric current that passes continually from the North to the South Pole, is the strong and steady force that turns the earth on its axis, giving to it its diurnal motion?

The more this element of electricity is investigated, together with work it has done, and is doing, the more evident is it that this subtle and all-pervading element is the powerful influence that animates, energizes, and quickens all nature, giving to the world life, without which, it would be as dead as a man whose blood had ceased to circulate through his veins and arteries.

In the imponderable elements of electricity and magnetism, the inscrutable wisdom, energy and power of the Almighty are evidently manifested. Electricity, instantaneous in its movements, passing through space without observation, and possessing irresistible power, may be classed as an element of "divine energy," operating in our solar system and probably in the universe.

56. *The Element Water; When and How Introduced on the Earth, and some of its Effects and Results.*—It may have been noticed, perhaps, that, so far, in stating the various elements and

processes used in the formation of the earth, we have not mentioned water, that important and valuable element which covers nearly three-fourths of the globe. Some of the leading attributes of water we have already described when writing about that element.

We have purposely refrained from naming that element in the building-up process of the earth, for we do not believe, as some hold and state in their world-building plans, that both fire and water were existing, as prevailing and active elements, from the very beginning of the world.

In considering the matter, we have not been able to perceive any reason why the Creator should introduce water on the earth until it should be required to do its own special and important work. The peculiar nature and attributes of water, being such as they are, we can perceive many reasons why the introduction of that wonderful element, among the other elements entering into the formation of the earth before the time appointed, would have interfered with, and prevented, the proper and wise development of the earth as we know it has been developed. The Creator had definite ends to accomplish, and in His wisdom, He would use the right means for carrying them into effect.

As the experienced architect would not plaster nor attempt to finish the interior walls of the mansion he was building until it was properly covered with a roof to protect his work from the destructive elements, so the great Architect would

not flood the earth with water before He had made preparation for it, and would then use it to perfect and accomplish His wise designs.

As we have already stated, the earth had arrived at that period in its formation when the various simple elements now existing on its surface were mainly deposited in the manner we have indicated, and at such places as would best serve the plans of the Creator.

However solid and compact the earlier depositions of materials may have been, now it is probable that they were made more porous, sponge-like and pervious than before, so that water would enter, percolate, and pass through it, wholly dissolving some elements, holding them in solution, or precipitating them under certain chemical conditions, and with very many of the simple elements forming a chemical combination, and so altering their nature, as practically to make a new material.

It is probable that the beds of the oceans and seas were once filled, or partly so, with material that was afterward dissolved by that universal dissolvent water, and were either washed away, or entered into combination with hundreds of other elements, or rather combinations of simple elements.

When this period had arrived for water to be formed and precipitated on the earth, it is reasonable to suppose that the earth's surface, at least, was supplied with the leading gases now largely prevailing, such as chlorine, carbon, nitrogen

and oxygen, in a free state, and also in combination with other elements. Especially was the earth well oxygenated, or, in other words, that important gas prevailed extensively.

Then the Creator caused one of His comets to deliver to the earth its train of hydrogen gas; perhaps just such a comet as the one known as "Donati's," which appeared in 1858 and attracted marked attention the world over, it being the grandest visitor the world had had in this the nineteenth century. That comet, in the summer of 1858, stretched across the heavens, its train being nearly 100,000,000 miles long, and several millions wide, composed almost wholly of hydrogen gas, as experts declared it to be, and as it now believed to be true. There was in the train of that comet, doubtless, a sufficient quantity of hydrogen gas, when combined with the oxygen already on the earth, to make the oceans of water that cover the earth.

With some such a deliverance of hydrogen on the oxygenated earth, our world was blessed with water, that divine element without which there could be no life, organic or inorganic. Its value cannot be estimated. Its singular adaptation to all known wants cannot be comprehended. Among the elements, its equal is not to be found on the earth, and perhaps, not in the universe. By the simple union of hydrogen and oxygen water is formed, and now it is precipitated everywhere, all over the face of the globe, percolating through this and that element, find-

ing and pushing its way everywhere with avidity into this and that material.

As in seasons of great drought the thirsty earth absorbs a large quantity of water before it is satisfied, so especially in its first deposition a large quantity of the fluid would be speedily appropriated. With what rapidity the continued combinations of the gases, hydrogen and oxygen were combined with each other, is mere conjecture, and so also, the particular process by which it was accomplished. But that there was a combination of these two gases, no chemist will deny. That it was instantaneous in large bodies, is not probable, for the Almighty in His creative works, does not manifest haste. The union of the gases and the formation of water doubtless proceeded as fast as the work it was required to do was being accomplished, and no faster. This appears to be the way of the Almighty in the affairs of the world.

When the great work which water has accomplished in thousands of ways, as manifested by its effects on the earth, is considered, the grand results are beyond comprehension.

We do not say here that all the water now on the earth was formed at one period of time, for we believe that in that work there were at least several distinct periods, such as the Creator in this building-up process of the world knew to be best.

When water made its first advent and was precipitated on the earth, its material then being

more or less porous, and in proper condition to receive the new element, it must be evident from our knowledge of the simple material elements of the earth, that there must have been not only a mutual attraction between the water and other materials, but in many cases, an uncontrollable attraction, violent in effect, and resulting in some new material unlike either of the others.

The advent of water on the dry material earth made many changes, vast in their nature, and so great in their number and variety, that no one now can realize what was accomplished.

Every atom of material that came in contact with water, either in the condition of moisture, steam, or drops of the liquid, would, in absorbing the same, or by chemical union with it, cause an expansion in the material, and would increase its bulk to such a degree that the aggregation of the infinite number of atoms would, as they slowly absorbed the fluid, cause an irresistible pressure to be exerted in every direction. But the power of this pressure would manifest itself most clearly in the direction of the least resistance; and that, in this instance, would be found on the upper or outer side of the earth. Irregular elevations and ranges of elevations, large and small, would thus be made and seen over the face of the globe.

To repeat: The first deposition of water being at the same time over the earth, and the element being received by the atomic material in the form of moisture, steam, drops, or running fluid,

would be absorbed by the same, and every atom increasing its dimensions, would potently assert its right to more room. The consequent result would be the expansion of all the material elements, which, by their irresistible force and power, would raise and break up the earth's strata as easily as do the small pieces of wood which, driven into the cracks or holes of the rocks, by their expansive power, when moistened, split the hard rock.

57. *How Were the Mountains Raised?*—On the same principle, and practically in the same manner, by the expansion of the earth's materials as they absorbed the water, were the ridges and elevations of the earth made, and the mountains formed. It was doubtless at this particular period in the history of the world, that the lofty mountains were imperceptibly raised and established for all time.

In this great upheaval, the face of the earth would be more or less broken up in an irregular manner, in small elevations or hillocks, and in mountain ranges more or less extensive, with millions of indentations, connected and disconnected, but so arranged as not to give the water free course to run off in streams and rivers, as now known on the earth.

But sometimes, and in some places, there would be exceptions to this rule of general expansion of the earth's material. That is, it would be limited to sections, if such there were, where the atomic material had no affinity for water. Also,

water would, in some sections of the earth, come in contact with some well-known elements that would be readily dissolved, especially if in a heated condition and held in solution, and carried or washed away, as one would perceive it might be. Again it might come in contact with some other chemical agent that would cause it, the water, to precipitate its solution of salts in an entirely different location. This is one way in which some elements, held in solution by water, might be moved from one place to another, and the earth would, in this way, receive fertilizing salts and various other solutions that would, in the end, tend to enrich and fertilize the land, and the better prepare it for the carboniferous age, and the other important periods that followed.

58. *Illustration of the Fact.*—Some years ago, in the month of March, we visited "The Glades" in Hall County, Northern Georgia, below the Blue Ridge Mountains. The elevation of "The Glades" being about 1,500 feet, its temperature at certain seasons often falls rapidly in the latter part of the day, and at night becomes extremely cold. At the time mentioned, it had been raining, more or less, for two days. The soil was well saturated with water, and the night in question was cold. In the morning as we walked out, a grand sight met our view. The sun was shining brightly in the valley and on the hills, which were covered with millions of tiny icicles, from two to five inches high, glistening in the rays of the sun like so many jewels.

The reason of this phenomenon, as is known, was, the ground being saturated with water, the sudden cold atmosphere caused the ground, including the water, to freeze; and, in freezing, it expanded according to its nature, and the water, in expanding, had to find room for itself. It could not force itself downward, for the soil already had all it could hold; therefore, taking the course of least resistance, it was forced upward, and just as fast as the water was congealed, the tiny icicles would form and grow upward. These are indisputable facts relating to this singular phenomenon of nature, which is well known in many other sections also.

The point to which we call particular attention here is, that it was the swelling or expansion of the earth's materials that drove those materials upward; and that, so far, no contraction of earth's materials can be shown.

Now we will take note of the next process of nature that followed:—Before eleven A. M. the warm rays of the sun had caused all the icicles to disappear, and a breeze springing up, the ground began to dry rapidly, and by three P. M. there was little or no sign of moisture, but instead, the earth showed numerous little cracks where the drying process had been going on. The high drying winds continued through the next day, and for several days, which is not uncommon in that section; the effect of which was to make all the little cracks in the ground larger, also to increase their number; and as one walked along

the roads, especially where the clayey soil prevailed, cracks that had become what might be called "fissures," now showed themselves. In critically examining the grass, it would be noticed that the ground had apparently settled away from the roots, from one-quarter to one-half an inch. These items named are well known to observers of the open country. It is a common observation, that dried up ponds are not only full of fissures, but that the bottom has also settled down. The longer the drought, the wider and the more numerous are the fissures.

Professor Dana in his *Geology* holds to the theory that "the continents were made from the beginning." He also states that "the average elevation of land above water level is 1,000 feet, and the average depth of the ocean is 13,000 feet," and expresses the opinion that "no contraction of the earth could have produced such extraordinary results."

When the formation of water and its deposition on the earth was made, the surface of the earth being in regular form, except such portions as may have been designed by the Creator as basins of oceans and seas, the water when deposited covered the whole face of the globe. Then, as the earth absorbed its portion of the element, its whole surface was gradually raised, but not equally so, as the mountain ranges prove.

The quantity of water that was absorbed and converted in this great work, one way and another, and now counted as the solid earth, was

vast, perhaps equalling one-fourth, if not one-third of the whole quantity of water deposited.

The upheaval of the earth's surface which we have attempted to describe, is not the result of fire, or a molten condition of the earth, and consequent shrinking in cooling, as many scientists and geologists claim; but we hold that the legitimate result of the swelling power of water when appropriated by the atomic elements of the material earth.

The theory which we advance and seek to maintain is that the elevations of the earth's surface are due to the expansion of its material elements by their absorption of water, and therefore, it is not due to any contraction of the earth's materials, as many geologists and scientists affirm.

Let the scientists and doubters test the truth of this theory by practical experiments, on a large or small scale, as best they can, and see if they can demonstrate their own theories to be true.

We know they can take an inflated rubber bag, tie a band about its centre, and thus cause the extremities to bulge out, but they cannot do anything of this sort with our earth, for it is wholly a disintegrated mass of material without binding force, which, when it contracts by cooling from a high degree of heat, or from drying up from any excess of moisture settles down in every direction and without power to throw or force up anything, leaving also many consequent fissures, and leaving the rocks in a laminated con-

dition, or in cubes, according as the law of their nature.

59. *Changes and Results Effected on the Earth When Water was First Introduced.*—We have briefly and imperfectly stated some of the results of water in its first union and combination with the dry material earth. We will endeavor now to mention a few of the effects and results of its chemical union with the many and varied simple elements found on the earth. This will be done briefly, for it would take volumes to go into detail.

None but an expert or practical chemist can have any idea of the vast number of changes that must have taken place when water first came into contact with the new elementary materials of the earth.

There were changes varied in their nature and character, as the material differed, and also in their effects and permanent results. There were changes divergent in their nature and radical in their results, changes slowly or quickly made, active, violent or explosive; all tending to advance rapidly the natural expansive and uplifting power of the elements in their combinations with the new element water.

In the changes effected by the chemical action of water, there were formed and liberated many of the leading and important gases, which were then set in active operation, doing the work assigned to them according to their nature.

There were changes effected making that

which was sweet, bitter, salutary, deleterious and destructive, soft, hard and vice versa; the water at one time holding one material in solution, then dropping it and taking up another it liked better. Water unites discordant materials firmly together, as orthoclase, feldspar, mica and quartz, in granite and gneiss, and in many other such instances.

To mention particularly the changes which water has effected and the work it has done, in and on this earth, is more than man is able to accomplish or comprehend. Scientific publications state "that heat and water combined have great power in changing the form and appearance of rocks;" also that "these effects on other elements are great."

60. *The "Aqueous Age." Some of its Important Results Considered.*—During this long aqueous age, the primitive character of the rocks must have been changed, and perhaps radically so; and they probably obtained during this period their present varied character and condition. Also during this age, and the succeeding one, the present character and condition of minerals were formed and developed, including the various classes of pyrites in which sulphur and other elements are stored, and manganese, containing oxygen, and very many other such items, all being the resultant effects of the combination of different materials with water under great heat and pressure and other varying circumstances.

In view of the many elements engaged, including the generation and disengagement of the gases, explosive and otherwise, their consumption must have produced a burning heat, covering, at times, the greater part of the earth's surface. Also, in view of the well-known radical changes that must have been made in the elements, evidence of which the earth affords in the many complex rocks, both igneous and aqueous, in minerals fused, and other combinations of materials that must have been effected under a high degree of heat and great pressure, and of the intense heat generated by electrical currents, it is evident that during this aqueous age of the earth, there must have been a degree of heat generated equal to any the earth has ever received. But while the degree of heat was sufficient to fully account for all the evidence of heat the earth can exhibit in past ages, it was not sufficient to consume the elements nor destroy nor impair their intrinsic value.

Considering the introduction of water on the earth, we hold the opinion that the resultant effect of that introduction of the element was fully sufficient to create and produce an intense degree of heat, mechanical, chemical and electrical, long continued and equal in intensity to any volcanic fire; and also that the heat herein named, reasonably accounts for all the evidence of fire which the earth exhibits during past ages, and therefore it is not necessary to adopt the theory, held by many scientists of this day, that this

world of ours was once a burning mass or ball of fire, and that, after long ages, the outer crust has so cooled down that it has become a suitable dwelling-place for man.

This theory we consider to be untenable and absurd; and the very idea of it greatly militates against the wisdom of the Creator. The carboniferous state of the earth, the condition of the rocks, and all of the earth's material, as far as man has been able to penetrate beneath its surface, emphatically deny any such supposed igneous condition of the earth.

The work of creating the world, it is not necessary to say, was very great. It had to pass through many operations, each of which was doubtless long continued. The Creator, though quick as thought in many of His acts, does not haste, nor even appear to regard the lapse of time, in the building of a world. He has no interest to pay on capital.

61. *The Natural Appearance of the Earth at the Close of This Period.*—It may be well, here to make a mental survey of the earth, and to notice and consider its condition after the element water had about completed its work of decomposition, disintegration and combination with other elements. To the beholder, the face of the earth in places would appear very much broken up, partly like a field ploughed and roughly exposed, with many little hills, and others larger, also numerous mountain-tops on every side, as when one, standing on the

summit of Mount Washington and looking out in every direction, beholds hundreds of mountain-tops.

Besides the open seas, the beholder would discover numerous ponds of water and small lakes, appearing, perhaps, not unlike each other, as is seen in a few counties in the State of Indiana, in which it is stated, that there are a thousand or more ponds and small lakes.

If the investigator will take his glass and examine critically the material earth as it lies before him, he will notice that the strata of the earth are laminated and broken up in all sorts and sizes of pieces and at all angles, irregular lots lying in heaps, so that one could not well walk over them. He will not notice, or see, any large round stones, rocks or boulders, on the earth. Nor will he see any of the smaller sized round stones used for paving so very common all over the earth. He will not be able to discover any of the beds of gravel, large or small, now found in all parts of the earth. Neither will he come across the tens of thousands of acres of sand, washed and unwashed; nor any deep beds of quicksand, every grain of which has not only been polished, but has been a polisher in the vast mechanical processes of the Almighty. The investigator will not notice any of these things, for as yet, no such work had been done on the earth as would produce them. Neither will he notice any such appearance of dirt, loam and soil, as the fields of our earth now exhibit, for as yet these

elements had not been reduced, mixed nor prepared for use.

As before stated, the face of the earth, at the close of the Aqueous Age, was in an uneven condition; its regular strata were broken up, and everywhere were scattered hillocks, hills, mountains, uneven indentations, pools and bodies of water.

To the eye of mortal man, this would be a disturbed, unsatisfactory, and dreary state of affairs. What shall or can be done to give the earth a suitable appearance, and make it a fit habitation for man, as it is now known to be? Glaciers could not do the work required, even if they had, at this period, been caused to exist.

XII

THE MODIFYING INFLUENCES OF THE MOON

62. *The Probable Course of Procedure Adopted by the Creator in Preparing the Earth for Its Next Change.*—What will the Creator now do? What procedure will He now adopt to prepare the earth and adapt it for the purpose and service He designed for it from the beginning?

From what we have been able to learn has been done, and how it was accomplished, which work is now open to the eyes of all observers, we believe the Almighty used our satellite, the moon, to do the great and important work of modifying, grinding and levelling the face of our planet, the earth, this great work commencing at or about this period of its history.

The moon is old, but how old, no man knows, but it is not probable that she is as old as our earth. Beyond all doubt she was created to be of service in many particulars to our planets, to which she is an appendage. She is the earth's hand-maiden. Her service in the past, in many directions, is beyond our estimation. We could not even now get along without our moon. The earth is dependent on her.

The moon, by its specific gravity, its nearness

to the earth, and therefore, its consequent great power of attraction, ever attracting the material earth, which power is made apparent to us by her influence on the movable materials, especially on the waters of the ocean in the daily rising and falling of the tides. Her power to move the waters and raise the ocean-tides is extraordinary, and, to many observers, unaccountable. The reason why the tides rose and fell every day, was unknown to the ancients. They called it "the grave of curiosity." The practical scientist will, on investigation, decide that the only practical way known to us of modifying the face of the earth, moving large bodies of its material from one place to another, smoothing down the rough places, grinding hard materials by attrition and erosion, separating the elements and levelling the surface of the earth, was by the adequate use of water, the most efficient element for that purpose found on the globe; and the moon alone possessed the power requisite for this work.

At times the water would be moving with great velocity, especially in places more or less confined. At other times it moved quietly along, like the gentle river, giving the materials it carried opportunity to settle and be deposited, as when forming a plain, or large, level surface. So also the water, by its action, its power, and its solvent qualities, has, in many cases, deepened its own bed, and sometimes made it altogether.

63. *The Power of Water in Motion.*—As stated, water in motion has great power over other

material elements of the earth. On this point, quoting from a geological publication:—"The transportating power of water is amazing: it is increased by the fact that the substance immersed in water loses in weight, so that if the specific gravity of a substance is less than that of water, it will be floated. The specific gravity of rocks is about two and a half, so they lose nearly one half their weight in water.

"The transportating power varies directly as the sixth part of the velocity. This explains the destructive effects of floods. A stream flowing twenty miles an hour, will carry one million times as much as a stream flowing two miles an hour. A slight check in velocity will cause a stream to throw down a large part of the material carried by it."

64. *The Power of the Moon Employed to Modify the Face of the Earth.*—On the basis of the facts mentioned, and other evidence, we hold that the Creator, in forming, modifying and changing the face of the earth in preparation for other developments, used the element water for that purpose, and that water in motion. Also, to give that water adequate motion and power, especially the oceans of it then on this earth, He appointed our satellite, the moon, to do the work; which by its specific gravity, under the known law of gravitation, it had the power to do.

But in order that the moon should be able to move the large bodies of water effectively, and drag them around the earth with her, it was

necessary that her orbit should be much nearer to the earth, or smaller than it now is; probably not over 150,000 miles, instead of 240,000, as at present.

Of course some will object to the very idea that the orbit of the moon was ever changed, but if not, why not? If the Creator, in His wisdom, saw best to do it, and could accomplish His desired end by doing it, what law was there against it? The moon was evidently created to do service for the earth during all its history, and just such service as the earth at any special time required. There was a time, we believe, before the Deluge, when the orbit of the moon was much larger than it is now. If there was a reason or cause for change then, why not at this particular period.

There is no moral question involved in the matter. God has more than one way to accomplish a purpose. St. Paul writes:—"There are diversities in operation, diversities in ministrations, diversities in workings, but it is the same God who maketh all things in all." It is, and was, one of those physical events that are ever taking place in God's universal domain. As the smith puts the iron in and out of the fire, and into the water, and uses his heavy hammers to bend and shape the heated metal as required, so the Almighty used the moon, which, by its specific gravity and nearness to the earth, possessed a tremendous power in attracting the elements of the earth; and this power was especially made

manifest on the water, moving that element as the earth turned on its axis, or as she moved around the world.

There are indisputable evidences that there was an age, long continued, when the mighty waters of the deep rolled over and washed the earth's surface continuously, moving large quantities of earthy material, forming hills, valleys and plains, all above sea-level. The waters dashed against the sides and even over the mountains in their impetuous career, ever impelled by some unseen influence they had to obey. Geologists maintain that "all the land on the globe gives evidence that it was once under water."

Let the investigator dig deep on the plains, or in the valleys, or through the great hills as well as the small ones, and he will find everywhere a mixture of earths and clays, of sand and gravel, coarse and fine, a conglomeration of all earthly materials, showing everywhere the moving and abrasive power of water, and the effects of its continued and rapid motion, driving and forcing along in its pathway the commingled mass of material it held in solution, or which lay in its course. As one passes over the land in the railroad cars, he will notice, in the cuts through the hills, the mixture of materials, the round gravel and cobble stones used for paving streets, and even large boulders, often high up in the hill; all showing not square and angular faces, but rounded and smoothly worn by the action and moving power of water continued during a long

period. Doubtless many of the small stones were once large boulders worn down by continued attrition with other stones. Their position in the hills, often high up, shows the tremendous power, depth, and force of the water that placed them there.

On many elevated plains are to be seen large rocks with surfaces rounded, that have been rolled over and over by water in rapid motion.

Water has been the means not only of transporting the rocks from place to place, but has also been the means of moving large bodies of soil, and scattering it over the surface of the earth. Geological works state as a fact that "All soil is derived from decomposition of rocks, except the alluvial soil. The soil is not always a criterion of the underlying rocks, because a great deal of the soil has been transported, and was not formed where found."

We repeat that, during this age, the moon was brought into service to do the special work of breaking up the strata more perfectly, of modifying, levelling, and preparing the face of the earth for the next development in the process of its formation by moving and dragging large bodies of water over and around it; the result of which was, by attrition, abrasion, and other effects, to pulverize, grind and reduce rocky elements to powder and the varied conditions in which they now exist.

Now these prevailing and evident effects were, beyond all doubt, produced by moving bodies of

water. No other adequate cause can be named that would have produced such vast, extensive and surprising results the world over.

65. *The Work Accomplished was not the Work of Glaciers.*—Of late years glaciers and their effects have been a prominent question among scientists. Glaciers have been credited with marks on rocks, and other evidences of their existence, which we believe should be credited to marks made by the rocky material carried by the rushing waters of many rivers, as may be noticed on their bottom rocks.

Glaciers, if they move at all, move slowly. They crush and grind, but do not move anything over and over. They make no sand, as found in the rivers, or on the seashore; nor gravel, nor round stones, great or small; nor do they form any mixtures of earthy materials. These items are all the results of moving or running waters.

Glaciers there are, and glaciers there have been; but our idea of the period and the manner and character of their formation differs materially from the opinion generally accepted by geologists on this question. In due time we intend to state when, and under what circumstances, glaciers prevailed over a great part of the world.

During the period just described, when the moon as the instrument of the Creator, completed its great work of modifying and levelling the face of the earth, it was prepared for the next important period through which it must

pass before it could be made a fit and habitable globe for intelligent beings.

The period now closed, may have continued 50,000 years or more in duration. We state a length to these periods; but we wish to have it understood that we have no basis upon which to decide their approximate lengths.

66. *A Period When Probably the Orbit of the Moon was Changed.*—The special work of the moon being now finished, it was necessary that her power to move the fluid elements of the earth, as she had done, should be decreased and limited, in order that the growth of vegetable and animal life designed by the Creator might be introduced on the earth and made to flourish and thrive without hindrance.

For that reason, therefore, the orbit of the moon was doubtless greatly enlarged by the Almighty, and its distance from the earth probably increased to about 300,000 miles making its regular circuit around the earth in about thirty days, which orbit the moon may have retained until special work was again required of her.

The moon, in this position, as she revolved about the earth, would have a moderate influence only over the elements, and not the controlling one, as before. She could keep the waters of the ocean in gentle motion, but could not drag them out of their beds and pull them over the land. Her hard work was done: now she rests from her labors, and is honored as the gentle and sober "Queen of the Night."

XIII

THE CARBONIFEROUS AGE

67. *Arrival of the Carboniferous Age. Some of Its Effects and Results.*—The period had now arrived when the Creator introduced the element of life on the earth. He, the Lord and Giver of all life, created all the germs of life, both animal and vegetable, and caused them to exist, grow and increase, on the land and in the waters, in many orders and classes, in endless variety, and in great abundance.

Vegetable and animal life were now created and caused to grow with special ends and purposes in view, which evidently, as we judge from the great and important results and immense benefits the inhabitants of the world now reap, were designed and created to store the world with all precious and useful products that might and would be required to preserve and promote the comfort, well-being, and happiness of the intelligent beings that, in the ages to come, would occupy it.

The orders and classes of vegetable and animal life, including every form of life known then to have existed, were not specially formed to be used then and there; and then, the object of their existence to be considered as accomplished. But

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rather, they were created for the use, benefit, and welfare of the race of intelligent beings now on the earth, and those that shall, in future ages occupy it, as has been stated.

When that particular age was closed, often called the "Carboniferous Age," it closed very generally with the death of these species of animal and vegetable life, but not with the extinction of all their remains, of which abundant evidence exists to-day, and will continue to do so long as the world shall last.

We state further that as these various grades of animal and vegetable life were created for the special purpose of preparing material for the use of future generations, it is not reasonable to suppose that they were of the finer, more delicate, or more noble and beautiful orders of animal and vegetable life now in being on the earth. There was then nothing to correspond with trees bearing fruit, as apples, peaches, etc., or plants blooming with flowers, as the rose, lily, etc., or in the animal life, as our pet animals, singing birds, etc. Besides, the then condition of the earth was not in harmony with or adapted to the growth or survival of the present orders of vegetable or animal life. As that age required carboniferous materials in abundance, it was provided as, bone, phosphate, the calcareous shell, lime, coral, and very many other items now required and in daily use, but too numerous to be mentioned.

The earth, in its beds of phosphates and in other items, affords abundant evidence that, at

one time, there lived on it very large animals with heavy bones which now supply us with phosphate material. These and other animals were created for a purpose, and were caused to multiply, grow, die, and leave imperishable remains. Many of the animals in that age, like the trees, probably had painless nerves only.

Doubtless there are evolutionists who may yet confidently expect to find the bones of some prehistoric animal without the caudal appendage. Let them not despair, but dig deep, and examine carefully, for who can tell but they may yet find for themselves the real truth of the matter?

God's wonderful processes of growth, of the coral, shell, chalk, and other materials, wholly disposes of the mythical "Nebular Hypothesis" of Laplace, and of the doctrines of the evolutionist; for the elementary materials are ever distinct, and do not run one into another.

Atom by atom, in God's laboratory, the pure and costly pearl grows slowly between the ignoble shells. By the operation of His laws of affinity, He alone can bring the pure and clean out of the unclean.

During this period some of the leading gases, combined and uncombined, must have prevailed and been more intense, active and controlling than they now are on the earth, as must be evident to all geological students. But what prevailed then, was best adapted to that age, in fact was necessary then, when many of these gaseous elements were stored away for the use of succeeding gen-

erations; as oxygen in maganese, carbon in coal, sulphur in pyrites, and many other such items.

During that age, man, and many other animals, as they are now constituted, could not have existed. Even after that age had closed, it took a long period for the elements to take their natural places, in respect to affinity and gravity. Noxious gases and fluids had to be absorbed or separated, purified and settled, before it would be safe to introduce man on the earth, evidence of which we will state later.

It answers our end and purpose, at this time, to include all these items mentioned, in one long age, although we are aware that the geologist, exact in his science, might arrange them definitely in several periods, giving some a precedence over others.

At the beginning of this age, doubtless the earth was fully prepared by the Creator for any special process through which it had to pass. The gases or elements then most prevalent in the atmosphere, were such as would promote vegetable and animal life, and were not detrimental to them. Also, the temperature both of the atmosphere and water was favorable, warmed, perhaps, by chemical action, but warmer on the average than it is in this age, yet not too hot to destroy the germs of life, vegetable or animal; just such a condition as would produce rapid increase and growth. These conditions being so, the Creator, in due time, made the germs, planted them, and caused the living growth to prevail

over the earth, or at least that part of it most favored with the light, heat, and invigorating electrical influences of the sun.

68. *During this Age the Earth did not Rotate on Its Axis as It now Does.*—The important question now arises, whether the earth, at this period of its history, had any diurnal revolution on its axis.

There appears to be no reason why the earth's orbit about the sun may not have been then, as it is now. But there are important reasons, making it evident that the earth, in that age, had no diurnal revolution, but had the light and heat of the sun on one side, or half of its surface at a time, for thousands of years.

It used to be thought that each planet turned on its axis, or had diurnal revolutions similar to our earth. But of late years, astronomers, with their more perfect instruments, have decided that Mercury, the planet nearest the sun, does not rotate; and they have also, within a few years, decided that Venus, like Mercury, always presents the same side to the sun. Therefore, there is no reason why our earth may not, at one period of its history, have had for thousands of years, one side presented to the sun, while the other remained in the darkness of night, and in the icy temperature of the poles. The earth itself affords abundant evidence of the fact that this was so.

Among the reasons bearing evidence that the earth for a long age did not turn on its axis, is

the fact of the steady and uniform growth of a stratum of coal in the carboniferous period that was thousands of years in its formation, and which bears no evidence nor sign of seasons. Also that, so far as the Northern Hemisphere is concerned, remains of vegetable and animal life belonging to, or such as thrive best in the Torrid Zone, are found north of the Temperate Zone.

In Central Europe, there are large and deep deposits of salts and potash that were thousands of years in forming, which could only have been formed in a tropical climate, when the earth revolved very slowly, say approximately, once in about 12,000 to 15,000 years. We now give a published description of those salt and potash deposits.

The Stassfurt salt and potash deposits had their origin, thousands of years ago, in a sea or ocean, the waters of which gradually receded, leaving near the coast, lakes which still retained communication with the great ocean by means of small channels. *In that part of Europe the climate was then tropical, and the waters of these lakes rapidly evaporated*, but were constantly replenished through these small channels connecting them with the main body. Decade after decade this continued, until by evaporation and crystallization, the various salts present in the sea-water were deposited in solid form. The less soluble material, such as sulphate of lime or "anhydrit," solidified first and formed the lowest stratum. Then came common rock-salt with a slowly

thickening layer which ultimately reached 3,000 feet and is estimated to have been 13,000 years in formation. This rock-salt deposit is interspersed with smaller deposits of "anhydrit," which gradually diminish toward the top and are finally replaced by mineral "polyhalit," which is composed of sulphate of lime, sulphate of potash, and sulphate of magnesia.

Overlying this potash region is a layer of impervious clay which acts as a water-tight roof to protect and preserve the very soluble potash and magnesia salts, which,—had it not been for the very protection of this overlying stratum,—would have been long ages ago washed away and lost by the action of the water percolating from above. Above this clay roof is a stratum of various thickness of anhydrit, (sulphate of lime), and still above this a second deposit of salt, probably formed under more recent climatic and atmospheric influences or possibly by chemical changes in dissolving and subsequent precipitation. This salt deposit contains ninety-eight per cent. (often more) of pure salt—a degree of purity rarely elsewhere found. Finally, above this are strata of gypsum, tenacious clay, sand and limestone, which crop out at the surface.

The perpendicular distance from the lowest to the upper surface of the Stassfurt salt deposit is about 5,000 feet (a little less than a mile), while the horizontal extent of the bed is from the Harz Mountains to the Elbe River in one direction, and from the City of Magdeburg to the town of

Bernburg in another. "The world's principal supply of potash salt is found at Stassfurt. Apparently this supply is inexhaustible."

There are other evidences that there was a long period when the earth did not turn on its axis, which investigators can either prove or disprove.

Admitting that there was an age when the earth rotated on its axis about once in twelve thousand years, what would in all probability be the result?

First:—Observers on the other planets (if there were any) would decide that the earth did not turn at all. Next, the earth, turning once in 12,000 years, would average 6,000 years one side facing the sun and the other 6,000 years without light or heat.

That side of the earth favored with the light and heat of the sun, would have a long and uninterrupted period favorable for an enormous growth of vegetation, supplying sustenance for all animal life;—life on the land, and life in the water, and everything would conduce to an increase of production of the classes and orders of life which the Creator introduced. Even the heat, in a great part of what is now the Frigid Zone, would be equal to that of the Torrid Zone.

69. *How and When Were the Glaciers Formed?*—But on the opposite side of the earth, deprived, as it necessarily must have been, of light and heat, all would be a dreary winter, barren of everything except ice. Large bodies of

water would be congealed and frozen deep down, forming the glaciers, making what is known as the ice age, or the glacial period.

The earth turning slowly from west to east, exposing to the light and heat of the sun one or two miles of new surface every year, would have its ice-barriers and glaciers gradually presented to the heat of the sun and melted; and when the water was sufficiently deep, floated and moved away from west to east, pushing and carrying with the icebergs, a large amount of debris, or earthly material; scattering it over the land, and covering up animal, vegetable and all other deposits that happened to be in their course, diverted more or less by large obstructions and mountain ranges. Geologists can conceive, and in a measure realize, how these things would be, and what would be the consequent results.

70. *Coal and Other Deposits, How Formed?*—On the opposite side of the globe, which for 6,000 years or more had been favored by the uniform and constant light and heat of the sun, there would be, during those favorable years, a regular and enormous increase of animal life on the land and in the water; supplies of food being also provided for in the luxuriant growth of all vegetable material, not only for present use, but for producing and storing away carboniferous and other materials in inexhaustible deposits, for use in the coming ages.

In this age, when vegetable and animal life predominated, important results superinduced by

chemical and electrical action, were doubtless also produced.

The earth, in its slow and imperceptible rotation, would move this luxuriant growth of vegetation, one or two miles in width of its surface, every year, from the light and heat of the sun into the ice-cold darkness of a winter's night. In a comparatively short period, the tall and closely compacted ferns, pines and other trees, under the extremely low temperature that surrounded them, would become brittle, and fall and crumble like icicles, and during the advancing period of the earth's rotation, would subsequently be covered, pressed down, and formed into a vein, or stratum of carboniferous material; and, in due time, and under favorable circumstances, become a broad vein, seam, or stratum of coal, of greater or less depth. This may be an outline of the manner in which some of the deposits of coal and other deposits of vegetable, mineral, and animal matter were formed.

There is in Athens County, Ohio, a deposit of bituminous coal lying between two creeks, Federal Valley and Marietta Run, about three miles apart. A few years since we had occasion to examine the mine. The seam, or stratum of coal was about eight feet in thickness. The deposit appeared to be perfectly level from creek to creek, excepting a gentle slope; for the mine drained itself, being above the level of the water in the creeks. The writer passed through it from one side to the other in a train of miners' cars.

Now and then there were specimens of coal still retaining marks of the fern or some woody fibre from which it was originally produced. The hill above the veins is from fifty to one hundred and fifty feet higher. Some distance below this stratum there are other seams. This exhibit is a sample of many other mines in Ohio, Pennsylvania, and West Virginia.

The rotation of the earth being slow and imperceptible, the glaciers and icebergs that would be formed, would receive the heat of the sun first on their easterly side. Their movements, therefore, would necessarily be from west to east, and what they carried, or pushed before them, would move toward the east. A New York architect informed the writer that, in making excavations for a building in the city, certain stones had been found, and there were none known to be like them this side of Lake Superior, from which place these stones had drifted to the east.

It will be perceived that the movement of the waters, dragged around the earth by the attractive power of the moon, are just the reverse.

The earth, turning from west to east, observes the moon first on its easterly horizon, pulling after it the waters of the Atlantic and Pacific. When she was near by, or had her orbit nearer the earth, she dragged the waters of the Atlantic over the easterly shore and land of New England, washing both. The great body of water rushing against the highlands of upper Massachusetts, the mountainous region of New Hampshire and Ver-

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mont, and the high elevations on the Hudson River, would be turned back and run down in a southerly direction, forming in part, the channels of that river, and of the Connecticut River; washing the whole southern border of the state of Connecticut, and cleaning the soil and sand from its shore, as in many places appears to have been done; making the hundreds or more of inlets, rocky and barren, between the eastern and western part of the state bordering on the Sound. The counter ocean currents would drive the sand over to the rocky base of Long Island, forming the greater part of that well-known island; a procedure we believe to have been a fact.

71. *Counter Effect of the Action of the Moon and the Glaciers.*—While the moon drew the water from the east to the west, the effect of which would be to move rocks, stones, and various materials, all in the same direction, from east to west; on the contrary, the effect of the glaciers, during the age in which they prevailed would be to move solid materials from the west to the east; for the eastern border of the glaciers would receive first the strong and continued heat of the sun, and would therefore be broken up and floated away to the east, the only direction in which they could move.

John Muir, a well-known geologist of California, a writer on glaciers, a defender of the theory of "erosions by glacial action," exhibited to a correspondent of the *Boston Transcript* certain sketches he had made. Quoting from the cor-

respondent: "One of the most interesting was upon a piece of wood, which he said had been centuries buried beneath the now fast-receding 'Muir Glacier'; it was about ten inches broad and three feet long. Upon this unique panel he had sketched the upstanding stumps of the time-old forest which the recession of the ice flood has exposed. Even the one from which this section had been broken, he pointed out to me." Here we have unexpected evidence in proof of the theory that the glaciers moved east, carrying or pushing material before them, or pressing it down to the earth and covering it over with debris.

Professor Dana, in his "Manual of Geology," (p. 783) gives this important and instructive record of facts regarding the many seams of coal, one above the other, found in Illinois.

"A section of the coal formation of Illinois, described by Worthen, contains sixteen coal-beds, large and small, separated by fragmental beds of lime-stone, containing abundant remains of marine life. The coal-beds indicate eras of emerged land; the marine fossils, intervening eras of submergence, and their number shows that at least sixteen alternations between the two conditions there took place in the carboniferous period. Facts make it certain that the great interior sea of the Continent communicated at that time freely with the ocean of the south. The same region thus went up and down, changing the dry land outline and the sea depths, and the changes went

on with extreme slowness, for coal-beds, as well as the much thicker marine beds, were slow in accumulating. Facts of similar import are afforded by all the successive formations, from the primordial upward, and alike on all the continents."

It will be noticed that Professor Dana mentions that the primary cause of the formation of these sixteen separate and distinct coal-beds, with the alternate formation of sixteen beds containing abundant remains of marine life, or fossils, was the rising and falling of the earth's surface. "The same region thus went up and down, changing the dry land outline and the sea depths, alternately."

This idea of the rising and falling of the solid earth, each movement being alternately followed by the inflowing of the sea, is unnatural and improbable, and cannot be proved as a fact, nor stand the test of sound reason. The earth is something more substantial than a great ship on the billows, rising and falling with the waves.

We hold that the facts here related prove conclusively that there was a period when the earth did not rotate on its axis as it now does, and then probably did not make one complete revolution oftener than once in 12,000 to 15,000 years, as before stated.

The reasons advanced to show that there was a long period when the earth did not rotate on its axis, as it now does, we believe to be conclusive, and that they best account for many

known geological facts; while the fact that some of the planets do not rotate also sustains the theory.

As we have before expressed the opinion that the Creator used our satellite, the moon, or the inherent power she possessed by reason of her specific gravity, to move large bodies of water over the surface of the earth, to accomplish certain purposes in the way of moving or mixing the earth's materials, levelling and modifying the face of the earth; this raises the question whether or not the Creator again called the moon into service after, or at the close of, the so-called carboniferous period, and glacial age. The power of the moon may have been employed after each complete revolution of the earth to cover up each successive new stratum of carboniferous material. From our point of reasoning, it would seem that there was a necessity for such additional work; and if there was a necessity, why should not the Creator use, or direct to be used, the means ready at hand to accomplish the desired end?

In our opinion this work was required to be done after the carboniferous period; and the moon, which, during that long period, had been 300,000 miles away, more or less, had its orbit made one-half or nearly that, in diameter, and therefore, in its revolution about the earth, would draw large bodies of water, or water sufficient to modify and level off the land, and at the same time to open up and form, by its effects, many of the well-known water-courses or rivers, great

and small, that run in all directions over the face of the earth; and without which the world would still be an uninhabitable globe.

Can any one conceive of a more effectual way of moving large bodies of earthy material, and doing the work named, than by the use of large bodies of water in motion.

If the Creator did not use this means, why not; especially as there was a necessity for His doing it, as well as a desirable end to be accomplished by having it done. There was no law against it. The Scriptures state that, with the Creator, there are great "diversities of operations" but always "the same spirit," to accomplish His purposes. It is also recorded of the heavens, that "as a vesture shalt Thou fold them up, and they shall be changed."

In considering the matter of the coal that lies hidden below the surface of the earth, it must appear evident to every intelligent observer, from known facts, that all the coal measures, the many strata of coal found at various depths below the surface, are of a vegetable origin: that at one period, or more likely several distinct periods, there were luxuriant growths of vegetation, rank in their character, differing probably in many respects from anything now growing on the earth, as the rich pines of the South, producing the pitch, tar and turpentine, differ from the white pines of the North: also that there are evidences that this rank growth of vegetation was continuous for a long period, without interruption of

seasons, as summer and winter: At the end of a period—time not determined—a distinct change came over the scene,—the whole growth of vegetation was levelled to the earth where it had grown; and this growth was covered with an earthy *débris* and held, more or less, at the time, in a watery solution. This stratum of vegetable matter afterward passed through a process of decomposition under pressure. Heat was generated, chemical action took place, and other conditions not known, changing under the pressure the character and appearance of the stratum or vegetation, resulting, after a period, in the various coal measures the earth exhibits. It also appears to be a fact of which the earth gives proof, that this growth of vegetation was repeated until there was another complete cessation of growth, caused by the same obstructing procedure, followed by another stratum of coal to be stored away for future requirements. This coal-making process was repeated a number of times during the carboniferous age.

It is also evident that while this coal-making process was being carried on, other important operations were being accomplished. All over the earth there was an orderly development of many products, as the deposition of various salts, lime, chalk, coral, asphalt, bone, phosphates, calcareous and silicious materials, and very many other items well known to geologists and other investigators.

Coal is a product of vegetation produced prob-

ably in the manner described. Petroleum, another of Nature's products found below the surface, is believed to be a product of coal by a process of distillation, abounding generally as it does in the coal regions. "Coal and petroleum are products of the organic world." Some geologists and chemists, who have critically examined the nature of petroleum, express the opinion that both vegetable and animal substances have contributed to the supply, and have tended to vary the character of petroleum.

72. *During the Carboniferous Age Animal as Well as Vegetable Life Prevailed.*—During the carboniferous age when there was such an enormous growth of vegetation, doubtless at the same time while there was this abundant supply of food suitable for all animal life, especially of the coarse and large species, in the water as well as on the land; there was this abundant and necessary supply of animal material combining with the vegetable in part to produce the petroleum, as well as the bone phosphates, and other resultant valuable materials found in the earth.

One writer states, "Petroleum produced or preceded the natural gas, and not the gas the petroleum." "Where gas is, petroleum ought to be found."

While all vegetable and animal life may be properly classed as creations, including their subsequent increase and growth in their several lines as created, yet there are other material products

of these creations, such as coal, petroleum, natural reservoirs of gas, the bone phosphates, coral, diamond, pearls, and many chemical and mineral combinations and other items, that might more properly be considered as manufactured products of the Creator, produced in His laboratory by processes He had devised, and which even now in many items are not as yet wholly discontinued.

During this long carboniferous age, the planet-building comets before mentioned, were doubtless supplying the earth with such additional material for the work, when and where required, such as carbon, oxygen, nitrogen, hydrogen and other gases, all atomic materials from the Creator's reservoirs.

The sun through all periods supplied the earth with light, heat, and the electro-magnetic energy required; though for a long period its energetic influence may have been thrown only on one-half of the surface of the earth at a time.

XIV

THE MODIFICATION OF THE EARTH'S SURFACE

73. *Additional Proof that Large Masses of Earthy Material were at Different Periods Drifted by Large Moving Bodies of Water.*—In support of our position on some points mentioned above we give a few extracts from Henry Howe's "Historical Collections of the State of Ohio," published in 1898; section on geology of that state.

"The geological structure of Ohio is as simple as that of almost any other 40,000 square miles of the earth's surface. All of its strata, except a small portion of the coal measures, were deposited in the waters of an ancient arm of the sea. Its most fossiliferous limestones, as the coniferous for example, stand for clear waters of tropical warmth. Its conglomerates and sandstones required strong currents for their transportation from distant shores.

"Over the various bedded rocks of at least two-thirds of Ohio, are spread, in varying thickness, the deposits of the 'Glacial Drift,' the most characteristic and important of which is the boulder clay. This frequently contains, in its lower portions, large accumulations of vegetable matter, the remains of coniferous forests that occupied the country before the advent of the drift or at some interglacial stage of its duration.

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Peat bogs are sometimes found buried in like manner, in or under the boulder clay. The deposits of latest age in this great series consists of stratified clays, sand and gravels. The boulder clay, or till, is filled with bowlders of northern origin, derived from the highlands of Canada and intervening districts. Some of them contain 2,000 cubic feet above the ground. They can in many cases be referred to particular localities, and sometimes to particular ledges, from a score of miles to 400 miles distant. The stratified drift contains vast accumulations of sand and clay, all of great economic value.

"The two divisions, the 'Conglomerate' and the 'Coal Measures,' can properly be considered under one head, inasmuch as they have common sources of value. Their thickness is not less than 1,500 feet, and they cover more than 10,000 square miles of the surface of Ohio."

The work in question contains a number of other facts which substantially agree with the above. The statement of the movement of the rocks from Canada to Ohio, accords with that of the New York architect, that in the excavations made in the city limits, stones had been found which were not known this side of Lake Superior.

These strata and beds of conglomerates mentioned in the geological formations of the State of Ohio, covering many thousand square miles, are composed, as the observer will notice, of an irregular mixture of sand, gravel, pebbles and

cobbles of all sizes. A mixture of various colors and materials all combined and pressed together, is a common rock strata named the conglomerates. Upon examination the observer will find that the materials, the sand, gravel, pebbles and cobbles, all have rounded surfaces, and, in appearance, are like the water-worn gravel, pebbles and cobbles of the seashore and the watery beds of our fast running rivers.

The intelligent observer will be convinced of the fact that these conglomerates, found so extensively over the earth, bear indubitable evidence that they are all the resultant effects of the action of water; not of water moving slowly along, but of water in rapid motion; large bodies of it moving with such irresistible force as to move large rocks as well as small stones, rolling all over and over incessantly, grinding them down, polishing and pulverizing all material, as the earth shows it was and must have been done.

The intelligent reasoner realizes from the vast effects everywhere manifest, that the materials were carried by moving bodies of water, combined probably, at some period, with glacial ice.

According to the law of gravity, all material being subject to its power, as is well known, the element of water would naturally lie inert in its bed as the ocean's waters now do, and could not be moved out of it unless some superior power or force moved it out; and then the extent and force of its movement would depend on the extent of the power exerted on it.

The earth bears abundant evidence that the oceans of waters have been, time and again, moved over it swiftly, as it were, with great force moving large bodies of material from place to place, piling it up here and there, even forcing great bowlders (as they are sometimes found) high up in the hills, and as water has no inherent power to move itself, (except to take a lower level) therefore some power independent of it must have been called into service to compel that element to do the work that has been done.

74. *The Moon by Moving the Waters was the Effective Power that Modified the Face of the Earth.*—The question arises, do we know of any element of power which if it had been called into service, could have compelled water to do its bidding. We answer, yes; there is our satellite the moon, the "Maid-servant of the earth," that could easily have performed all the work that has been done in the past ages; the extent of her power depending on the distance she may have been from the earth while revolving about it. What has been accomplished, we hold is the result of her power in accordance to the law of gravitation when revolving about the earth. Even now, at her distance of 240,000 miles, she is doing a great work for us in her influence over our atmosphere, and her power over the waters, as manifested in the tides of the ocean.

It would appear from facts exhibited by the earth, that, at different periods in its history, it has passed through at least two distinct condi-

tions in the process of its formation, but how often repeated, we do not profess to say. After the earth was, or while it was being prepared for man, the first condition would be a comparative state of rest, when the earth made but one complete revolution on its axis in probably not less than 12,000 years, during which time there was a luxuriant growth of vegetation, great increase of animal life, for the purpose of supplying the earth with phosphates and other materials, also during this period of rest there were large deposits of various salts, lime, chalk, coal, formations of metals, and many other items known to practical geologists, as previously stated.

During this condition of rest, growth and increase of important material on the earth, it would be inconsistent with the progress of this creative work to have the moon revolving near it, disturbing and destroying the elements being prepared for the use of man. So, therefore, the power of the moon to modify and disturb the face of the earth was, we believe, held in abeyance until the time arrived for the moon again to do her necessary work.

If, in the process of forming the world, it was the Creator's plan to do the work named, is there any reason why He should not direct the orbit of the moon to be made 150,000 or 200,000 miles from the earth, instead of its present distance; or so made as required to accomplish the desired end? There was no law against it. Whether the moon was put to service as indi-

cated, or not, is not a question of morals, but of utility; not a question of unchangeable law, condition, or proceeding, but one of expediency that underlies some of God's ways, as well as those of men. Expediency is observable in Divine economy as well as in human.

The doctrine we hold is that the Creator, in forming the earth and world, used at times special means and forms of procedure to accomplish desired ends, after the same manner, and for the same practical reasons, that He endowed the element water with special laws to control and adapt it for various purposes, ends and uses, as necessity required. (Note the special laws named in Chapter xi.)

These special acts on the part of the Creator in the formation of the earth, and the endowment of the world, are allied to the doctrine known to theologians as "The special acts of God's Providence in the work of redeeming man."

THE ACTION OF WATER FURTHER CONSIDERED

75. *A Topical Survey of all Sections of the United States Exhibits the Effect of Moving Waters in the Past.*—Some years ago, the writer was interested in a hydraulic mining enterprise in Northern Georgia, where a ditch or conduit for conveying water to the mines was constructed along the top of the hills and the high ground, in length some six miles or more. In going over the route we noticed a number of valleys starting out from the ridge land, and the impression was received that, by closing up some of the valleys below by small embankments, which seemed practicable, a number of fair-sized ponds might be formed, suitable for raising fish for the benefit of the people of the country,—the use of the water for mining being required only during the day. The superintendent was directed, from the New York office, to close up some of the valleys by small dams or embankments where most practicable, and fill with water from the conduit higher up. Word came back that while the valleys starting out from the ridges were all narrow, they soon began to spread out wide and discharge their waters into the river. New ponds could not be formed unless it was by the streams whose banks nature had already adapted for that

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purpose. The elevation of the river, the Chattahoochee, at that particular place, was about 1,300 feet above the sea, it being one of the highest rivers in the United States.

On considering the matter we realized that the moon had done her work there as well as in other parts of the world, preserving only such natural basis as may have been designed. Excepting the Great Lakes, whose waters fill natural basins formed by the Creator, there is not a lake, worthy of the name, to be found in all the states south of Lake Erie, down to the Gulf of Mexico.

If the moon had not, by its power or control of the waters, dragged them over the states, removing all obstructions, opening up the water ways, channels and rivers, giving them free course and so modifying the face of the ground that all the waters would naturally find their way through the small creeks, channels and rivers to the sea, then, there would necessarily have been scattered over the land, thousands of marshes, swamps, quagmires, ponds and small lakes, tending not only to depreciate the value of the land, but making large sections of the country a fruitful source of malaria and other noxious diseases.

The moon in her day has had a great work to do for the earth; and she has done it most effectually. She ought to be greatly appreciated for her past labors, and honored for the benefits the earth now daily receives by the faithful performance of her work.

There was a time when a privileged spectator, standing where he could behold the mad rush of the waters to and fro over the face of the earth, regardless of consequences, not caring for aught, but seemingly beyond control, might, in his surprise and astonishment, have asked the moving waters, why they were in such haste to spread and cover the land, not regarding the rocks or impediments in their way, undermining the hills, filling the low places and the valleys, levelling the face of the earth and depositing over all the plains the materials which they were carrying.

He might say "O waters, emblem of life and death to all animated nature, why are ye so troubled, ever in a state of unrest, changing, pushing and driving all before you, this way to-day, and to-morrow returning; undoing what you have done, never at rest, but disturbing the very earth that has found you a bed in which you might quietly abide? Yet unceasingly you are dashing against rocks and mountain-sides, and rushing through gorges in mad haste; and in your impetuosity, and by invincible pressure, compelling stones and even rocks to obey your authoritative command to move on, and ever on."

There was a time, as the Scriptures state (see Job xxxviii. 8-11), when God limited the sway of the great ocean of waters, when He declared and asked His servant Job, "Who shut up the sea with doors, when it brake forth as if it had issued out of the womb: When I made the cloud the garment thereof, and thick darkness a swad-

dling band for it, and brake up for it my decreed place, and set bars and doors and said, Hitherto shalt thou come but no further; and here shall thy proud waves be stayed." By that decree the proud waves of the ocean of waters were stayed in their course and the sea and the earth had rest.

76. *Utility and Value to the World of the Arrangement of the Continents, Points of Land, Islands, Oceans, Seas, Lakes and Rivers Over the Face of the Earth.*—In investigating the questions involved in the formation of the earth and the world, we shall find its physical geography to be worthy of our careful consideration.

It is well to inquire into the general arrangement of the continents, the location of the large islands, the direction and extent of the mountain ranges, the valleys and the plains, and observe their average elevation above the waters; also the extent, size and location of the ocean-beds, the seas and the basins of the lakes, and the channels cut out of the earth for the rivers; and notice whether they are all the results of a definite plan and design on the part of a wise Creator, or whether they are the effects of some hazardous chance results, produced after the plan of Laplace's Nebular Hypothesis, or by any other work of chance.

That these arrangements and conditions are the result of any chance procedure, we do not consider worthy the thought of any sensible man.

Suppose, for instance, that the lines of the great Continents America, Europe, Africa and

Asia, or that the Eastern and Western Hemispheres of the globe encircled the earth from east to west instead of their present lines north and south, allowing free scope for the waters of the Atlantic and Pacific Oceans to move around the earth near the lines of the equator, as they now have to move from pole to pole, would not the evident result be a continuous current of a large body of water moving around the earth's surface near the equator, which current would be accelerated, both by the centrifugal force caused by the revolution of the earth near the equator, at the rate of 1,000 miles per hour, and also by the gravity attraction of the moon revolving about the earth.

Such a current would be irresistible. At any rate it would be hard to contend with, when necessary to sail against it; and would also, in many ways, be destructive in its effects. These boundary lines of the continents, and these arrangements over the world of waters of the oceans, are all evidences of the wisdom and goodness of the Creator.

There are a number of other reasons manifesting wise design on the part of the Creator, some of which we will mention later. The equalizing of the temperature of the atmosphere and the water over the globe, and their various changes, are all-important and necessary for the comfort and well-being of man and beast. The development and increase of production of vegetable as well as animal life are all part of the effects

and results of the present arrangements of the oceans, continents and mountain ranges of the earth.

77. *Why the Unequal Diameter of the Earth at the Equator and the Poles?*—We will now examine the important question, why the unequal diameter of the earth at the equator and the poles, and the cause for the same, to which we have before alluded.

It is admitted by astronomers that our earth, and also some of the other planets, especially Jupiter, are flattened more or less at their poles. The question we now ask is, whether this inequality was caused by design, to accomplish a purpose or an important end; or whether it was wholly without design and only the chance result of centrifugal force.

Camille Flammarion, the author of the "Popular Astronomy," adopts Laplace's theory, the "Nebular Hypothesis," and states that the planets being flattened at their poles is certain evidence of the truth of that theory.

Quoting Flammarion: "Let us imagine then an immense gaseous mass placed in space. Attraction is a force inherent in every atom of matter. The denser portion of this mass will insensibly attract toward it the other parts, and in the slow fall of the more distant molecules toward the more attractive region, a gentle motion is produced, incompletely directed toward the centre, and soon involving the whole mass in the same motion of rotation. In turning it becomes

flattened at the poles and gradually takes the form of an immense lens-shaped mass of gas."

In other parts of his "Astronomy" the author reiterates the statement that as some of the planets are flattened at their poles, it is evidence of the truth of Laplace's "Nebular Hypothesis."

These reasons, the same as those advanced by Laplace, as cause for the lesser diameter of the earth at the poles, still continue to be the favorite theory with many writers on astronomy. Suppose an experiment is tried. Procure a hollow globe, from fifteen to eighteen inches in diameter, glass, or partly so, so as to be able to observe the results. Have it so arranged and adjusted that it can be turned rapidly on its axis, then fill it half or nearly two-thirds full of water, close up aperture, then turn rapidly and it will be found that the water is filling all the outer circumference of the globe, leaving the poles bare, and if the globe is turned very fast the water will not only leave the poles bare, but the axis of the globe itself will be free from water. If in this particular, the earth in its formation was subject to the control of centrifugal forces alone, its shape, instead of being convex at the poles as it now is, would be concave.

Laplace's theory, if it proves anything, proves too much. According to his view, the great nebular mass, in order to throw off a world, had to turn on its axis with very great rapidity. Camille Flammarion admits this when he asks the question (see "Popular Astronomy," p. 72,)

"Will the sun ever give birth to a new world? This is not probable. For this purpose it would be necessary that its rotation should be enormously accelerated: it should be 219 times more rapid." According to their theory, the sun itself ought to have a much greater equatorial than polar diameter, but instead of that, the diameters of both are the same: it is a perfect sphere: astronomers state that no difference can be perceived.

The planet Jupiter shows, in proportion, much greater inequality in its equatorial and polar diameters than does our earth. The equatorial diameter of Jupiter is about 87,500 miles, while its polar diameter is only about 82,500 miles. It turns on its axis in a very short time, its day being only ten hours. The speed of Jupiter at the equator is about twenty-seven times greater than our earth. All these differences in the size, weight, and rapidity of movements of the several planets, were doubtless made by the Creator, and adjusted so perfectly as to meet every requirement of the conditions of the several planets.

Admitting it to be a fact, as the astronomers state, and which we accept as a truth, that there is an inequality in the diameter of the earth at the equator and at the poles, we reason that this was not only known by the wise Creator, but was specially designed by Him for a good cause, and to accomplish wise and beneficent ends.

We find on examination that one design and object of the particular and measured inequality

of the equatorial and polar diameters of the earth, was evidently to regulate and equalize, to a certain degree, the temperature of both air and water the wide world over; together with other beneficial results tending to advance the comfort and welfare of the human race and of everything that has breath or life in the world.

The question is, by what means are these grand results accomplished, or how are the changes effected? We answer, by the simple operation of two forces of nature:—specific gravity on the one part, and centrifugal force on the other,—aided by the ocean of waters that convey the heat, together with the designed conformation of the continents and mountain ranges that direct the currents. We find that the earth, in its diurnal revolution at the equator, as is well known, passes through space at the rate of 1,000 miles per hour, while at the poles it is practically at a standstill; or say 100 miles per hour when distant from the poles about 1,000 miles. The natural tendency and effect of this rapid motion is to cause all material to move toward the equator. This effect is made manifest by the movement of the air and the water, especially the latter, toward the equator; and the water would continue to be, as it were, piled up there, were it not for the force of another natural law, “specific gravity.”

Gravity is a constituent attribute of matter that so far counteracts centrifugal force as to influence and compel the water to return to the poles as

naturally as if it were running down hill, which, practically, it is doing; for evidence of which, notice the Gulf Stream passing through the Atlantic Ocean to the northeast; and, in the Pacific, the stream of water that washes the western coast of North America, raising greatly the temperature of that coast, even up to the high latitudes.

The natural law, the cause and effect controlling this important matter, is in substance stated in scientific works thus: “Weight of a material is downward pressure due to gravity, diminished by the centrifugal force due to the earth’s rotation. The weight of any body is increased about $\frac{1}{180}$ by removal from the equator to the poles. The force of gravity at the earth’s surface increases northward or southward from the equator toward the poles.”

It has been ascertained that the equatorial diameter of the earth is about twenty-eight to thirty miles greater than its polar diameter. According to natural laws, this inequality in the diameters was required in order that the increased gravity at the poles should exactly counterbalance the centrifugal force of the movable elements at the equator.

This interchange of the elements, especially of water from the poles of the earth to the equator, and back from the equator to the poles,—which interchange is not always perceived—was necessary in order to keep the requisite movement of the air and water encircling the earth, in a con-

dition to make a proper distribution of its heat, and maintain that wonderful equalization of temperature the world over, known and appreciated by all intelligent men.

The water warmed in the Torrid Zone, was influenced to proceed to the Temperate and Frigid Zones, distributing its heat to the colder regions on its way; melting the ice, and driving away the freezing atmosphere, giving renewed life to the animal and vegetable kingdoms in all these cold regions; modifying the climate of England and all Northwestern Europe, away up to the Arctic Seas, thereby making the climate of those northern regions not only comfortable, but delightful.

So also, in the wide Pacific Ocean, there are many interchanging currents that equalize the temperature of that hemisphere; how many, and where, we do not profess to know. But there is one well known to the people in the western part of the United States, and that is the one running up the western coast of North America, that modifies the temperature of that coast, making it comfortable, during part of the year, even in the high latitude of Alaska.

If there are currents of water ever passing from south to the north, it is evident that there must be currents from the north to the south restoring the equilibrium. The currents tending to the south are not so apparent, nor so well known. The icebergs of the North float away to the South, and it is said to be in evidence that there

are cold undercurrents of the ocean passing from the poles to the equator, particularly in the upper latitudes. It is also in evidence that the cool currents of the sea do so temper the hot atmosphere of the Torrid Zone that it is kept in comparatively comfortable condition, so that, in many of the West India Islands, the summer heat does not exceed that of the city of New York.

In this distribution of the heat, and equalization of the temperature of the world, water is found to be most wonderfully adapted for this work. It may be well to remember some of its attributes as mentioned, when reading about that element, in the earlier sections of this work.

Take another view of this question. Suppose the Earth was a perfect sphere, its diameter at the poles equal to that of the equator; and there was a full supply of water sufficient to cover the polar extremities of the earth, as they are now supposed to be; and that the earth revolved on its axis at its present velocity, which at the equator is 1,000 miles per hour; the effect, according to the law of centrifugal force, would be to draw this extra amount of water, required to cover this large addition made to the earth's surface, and pile the water up in the equatorial regions, drowning out the present cities, and even covering some of the mountains.

Or, suppose the diameter of the earth was everywhere equal, and that the supply of water was as it is now, and no more; the centrifugal force would distribute and keep the supply of

water as it is now, but the polar extremities would be without water, and the earth would be sailing around the sun "under bare poles."

Besides, these poles being deprived of the warm currents of water from the equator, would be, and continue to be, in an icy cold condition, a nuisance and a detriment to the inhabitants of the world at large.

Unbelievers might say, in such a case, that the Creator had made a blunder. For these and other reasons, we therefore maintain that the unequal diameter of the earth at its equator and poles manifests a perfect design on the part of the Creator, and is an evidence of His wisdom and goodness.

The sum of the matter would therefore appear to be, that the result of the unequal equatorial and Polar diameters of the earth, is the unequal specific gravity of its materials at the equator and the poles.

The consequent effect of this, together with an extensive dissimilar degree of heat at those places, is a constant interchange of the movable elements of the earth between the poles and the equator, the value of which, to all animate and inanimate nature, cannot be estimated. Who will say that all this is due to chance, and not to careful design?

There is a greater difference between the equatorial and polar diameters of the planet Jupiter, than that of any of the other planets belonging to our solar system. This planet, as is known, is

the largest in our system. It is about 1,200 times larger than our earth. Its rotation on its axis at the equator is about 25,000 miles per hour, turning as fast, then, in one hour, as our earth does in twenty-four. Such great rapidity of its rotation would evidently require the great difference that exists in the equatorial and polar diameters to counterbalance the centrifugal force manifested at the equator, in order to preserve all the elements in their state and place, as designed by the Maker of the planets. Doubtless all the conditions required to preserve the equilibrium, and perfect every interest of the planet Jupiter under all circumstances, has been abundantly provided for by its Creator.

The Scriptures state that "God Himself formed the earth and made it," and they also give many graphic descriptions of His handiwork, but such a statement as the following recorded in Isa. xl. 12, we once considered rather a hyperbolic statement, but now find the record was, and is, absolutely true. "Who hath measured the waters in the hollow of His hand, and meted out the heavens with the span, and comprehended the dust of the earth in a measure, and weighed the mountains in scales, and the hills in the balance?" The grand and orderly result of the earth in its course year by year about the sun, and the exact time in which it is performed, and also in its daily revolution on its axis; the regularity of the seasons, and all its movements, prove the truth of the Scripture statement.

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XVI

CHEMICAL CHANGES IN EARTH'S MATERIAL

78. *Evidence of Great Chemical Changes in Earth's Material.*—A score of years ago, while visiting the work of some miners digging up the gravel and washing the same in a sluice-box to gather the gold it contained, I noticed that they did not dig below a certain level of what appeared a greyish earth or clay. I inquired why they did not go deeper and perhaps come to more of the gold-bearing earth. They replied that they were down to the slate, or rotten granite, as they called it, and that there was no gravel below. I replied that that was only a mixture of greyish earth or clay, and they were told to go down deeper, some four or five feet at least, and see if there was not more gravel. At my direction they dug down, and, after a while, noticing the condition and realizing in a measure the situation and the facts, they were directed to go on and mine as they thought best; they informing me that "that condition was common in this country." Turning aside, I contemplated with surprise what powerful agents the Creator must have employed during a long period, by which miles of "flinty rocks" were made as soft as "miry clay."

In considering that matter some years after-

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ward, it appeared to me to be a fact that the beds of gravel lying spread over the ground in that condition, were the result, and bore the effects of water in motion; running and breaking up the quartz, making the water-worn gravel, and depositing it over the surface of the then undecomposed rocks.

This being so it would naturally follow that the rock over which the water ran, and over which the gravel was deposited, was, and must then have been, in its hard undecomposed, condition, otherwise the gravel would have been mixed with the soft material; but as there was a distinct line of separation of the materials, it is evident that the rock basis was decomposed after, and not before, the deposit of the gravel.

It might be well for geologists to inquire into this matter, as it may assist them in fixing the comparative date of some of nature's operations; especially when gold was deposited in some sections.

As this incident relative to the decomposed granite occurred nearly twenty years ago, I thought best to confirm my impressions, and so wrote to Mr. Charles R. Clemons, who for many years has had charge of the property, and the following is his letter in reply.

"THE GLADES, Hall Co., Ga., July 6th, 1898.

"A. G. JENNINGS, ESQ.,

"DEAR SIR:

"In regard to your question on gravel, would state that in the Glade Branch, Stockeneter, and in every branch on the

Glade properties where gold has been washed, under the gravel is found decomposed granite or gneiss, which is found from five to fifty feet and more below the surface soil. In the Glade Branch it is more than fifty feet. In the Stockeneter and Dry Hollow and Still House Branch, it is from five to ten feet, immediately on the granite, etc., rests the gold gravel. The granite and gneiss is decomposed in many places fifty feet more or less. It then becomes hard and continues so.

"I think you are right concerning the gravel deposits. They must have been deposited by the action of running water on solid granite or gneiss foundations, and therefore the decomposition of those rocks, as you say, must have occurred afterward. The round water-worn gravel confirms the action of water in some way. That the foundation rocks were firm and solid is evidenced from the fact that the gravel rests upon them, and is not imbedded in them. Had the foundation been in a state of decomposition at the time the gravel was deposited, a conglomeration of granite and quartz gravel would have been the result. But there is no such conglomeration, but a distinct line marks where the gravel ends and the decomposed granite begins."

Mr. Clemons is an intelligent English gentleman of high reputation. During the Sepoy war in India about 1855, he was in the employment of the East India Company, and a Governor of one of the Provinces of India. On the transfer of the power and interest of the East India Company to the British Government, he came to America.

79. *Local Evidence of Great Age of The Glades, Hall County, Ga.*—In our investigations we have not paid particular attention to the different geological ages, as they have been described more or less distinctly by geologists and recorded

in their works; not considering it important in this work to regard those periods, but noticing that Dr. Dana and other geologists in their publications state that the earliest age of the earth, of which there are marked geological manifestations, is what has been named the "Archæan Age" and by others the "Azoic Age," and not expecting ever to see any evidence in nature of the so-called far-off age, the writer paid little or no attention to these items; but noticing more particularly in Dr. Dana's works that granite, gneiss, graphite, the diamond, and some other materials, were all evidences of the remote period called the "Archæan Age," we realized then that all the evidences of the so-called "Archæan Age" of the earth,—were in that ten square miles of earth of the Glade property; that they contained the oldest known elements on the globe, though we do not believe at all that they are the foundation materials of the earth.

We note some of the items as follows: There is one small stream of water that falls over a rock 100 feet high, then runs through the property some four miles, discharging its water into the Chattahoochee River, which at that point is some twelve hundred feet above the Gulf of Mexico, into which its water flows. Another small stream on the property falls over rocks some sixty feet high. The mass of rocks over which these streams fall were believed to be granite, but geologists and experts in New York say the rock is gneiss, one of the primitive rocks

as supposed. In washing the gravel on the property for gold, a few diamonds have been found. On one part of the property the itacolumite, or flexible sandstone abounds. The graphite is also found on part of the property in various conditions: also manganese of good quality, and lately it is found in a decomposed condition, making the umber or fine dark mineral paint. Yellow ochre also abounds. In one place the yellow ochre can be seen in the form of the original vein of iron ore, which has been wholly or partly decomposed: also quartz, crystals, and garnets. In washing for gold, the monosite appears. There are fine clays, fire-clays, kaolin, materials for pottery or porcelain ware, and other minerals in small quantities not mentioned.

If some of these items are evidences of the "Archæan Age," then The Glades may claim to be very, very old in years, and have witnessed, during the long ages, the many changes through which our earth has passed.¹

¹Some twenty years or more ago, The Glades and its immediate vicinity was visited, and its physical character and surroundings examined and noted by Prof. H. Carvell Lewis, then a young geologist, who afterward attained a high position in his profession, and was loved and honored by those who knew him.

In the Spring of 1883, on the eve of visiting Europe, in pursuance of his geological researches, Prof. Lewis again visited The Glades to examine more particularly its geological surroundings and to verify certain evidences of the matrix of the diamond and other items. He soon left for England where after a short and severe illness he died.

80. *Electricity, Some Idea of its Nature, Power and Effects.*—Electricity is in many respects the most mysterious and wonderful element that prevails in our solar system; and, in all probability, in the universe. This mysterious element, though unseen and imponderable, is ubiquitous, moving with the velocity of light, possessing great energy and power, and doing work that cannot be measured, realized or understood. This element, or force, when in an accumulated condition, and not under control, is destructive of life and property, like a flood of waters breaking away suddenly from its confining banks or pouring down from the heavens above. This singular element does, in some respects, resemble the Spirit, and manifest the power of the Most High. There is no place where it is not found; but everywhere there is evidence of its presence and the work it has performed.

Almost every day of late, there has been some new development of its power, and of the various uses and purposes to which it may be applied. To very many it would appear that electricity was a new force discovered in this generation. When we consider its rapid development, and its applied uses in many arts and industries of the day, one is astonished at the grand results achieved and the immense value of electricity to the world. This unique element is subject to singular though exact laws, peculiarly adapted to its nature, and also to its apparent freedom from many other natural laws. It mani-

feats the inscrutable wisdom and power of the Almighty.

The nature, extent and limitation of the laws that govern it have now been pretty well ascertained, and are quite well understood by the electricians. As the railway car requires the iron track on which to move, so this element requires the conducting wire in many of its operations, through which, or by means of which, it does its work or tells its story.

This wonderful element moves through its conductors with inconceivable velocity, doing its work according to its potency. While air, gas, steam, or water, in passing through their conducting pipes, agitate, and if not securely fastened, move them; electricity, unlike any of these other elements, passes through its conductors instantaneously without apparent agitation, or without giving sensible information of its passage. In some of these respects, and in many others, we have no knowledge of any element like it in the universe.

Electricity is undoubtedly the energetic power, or working element, of our solar system. Like heat and light it is generated in the sun, and thrown off by it; and the earth, requiring its life-giving influence, attracts this element to itself; and, doubtless, a large portion of the elements named are brought to the earth in lines converging with it, and thereby much is saved that otherwise would be lost in space.

Electricity, we believe, is the influence that en-

ergizes all living things on the earth, animal and vegetable; the life-giving influences of the light and heat that emanate from the sun, producing, doubtless, other effects besides those that have been observed.

For a long time we have held the opinion that the particular degree of electricity in the atmosphere had some part or connection with the degree of heat, humidity, cold, or moisture registered in the atmosphere; and we have therefore hoped that the Government observatories would be directed to prepare appliances for measuring and recording, from day to day, the amount of electricity in the atmosphere, as they do the temperature, humidity or pressure.

Some time since in talking with a friend over the long distance telephone, the question and answer from the familiar voice followed each other instantaneously. According to the old rule, sound travelled through the atmosphere about 1,100 feet per second. But over the telephone, question and answer were immediate; the sound travelling when driven through the conductor by the electric current, instantaneously, or as fast as light comes to us from the sun. It is evident that it was the current of electricity that transmitted the sound through the telephone wires. If the force or energy of electricity transmits or carries sound in its instantaneous movements, why may not this force, that proceeds from the sun, also carry light and heat? We say, why may it not be the force that transmits to the earth

and to all other bodies in the universe these other imponderable elements. What element is so well qualified, constituted, fitted, or capable of doing this work, as the mysterious force of electricity?

We do not hold to the wave theory for the transmission of light and heat from the sun. When one, standing in an open country place, notices the sun is hidden from view by a far distant cloud, he notices also that the instant the cloud passes and the light of the sun breaks upon his sight, that instant his face feels its warmth.

It might be said of sound that it is an effect, while light and heat are conditions, and the force of electricity has control of all three; but as for gravity, that is a quality or attribute. It stands alone: it is independent.

That electricity everywhere prevades this earth, and cannot by any means be exhausted, any more than the ocean can be exhausted of its waters, is evident. Also that, in some manner, electricity enters largely and continuously in the operations of nature in a far greater degree than man can realize, must be evident.

This inscrutable power, or force, is under the control of, and subject to, the perfect laws its Creator has made for it. As previously stated, we believe the God of order has provided for this elementary force, and for the control and wise distribution of its power and influence, a system of conduits or conductors, large and small, adapted to the work required to be performed; and that these conduits are below the surface of

the earth, as the arteries and veins of man are below the skin; placed there both for protection, and to promote their beneficial use. There is a perfect arterial system of electricity. The intelligent observer of our day is assured that the Creator has made every provision necessary to perfect the system, and increase the utility, of this wonderful element which heretofore, has been practically unknown.

Electrical energy and influence is, we believe, manifested in small things, in quiet and imperceptible ways, as well as when, generated in the thundercloud, it passes down to the earth, cleaving the atmosphere with its flaming stroke and crashing report.

It also performs some very fine work, such as making the fog and the rain clouds to float in the air and sky above us, by making the tiny cells, vacuum cells, or cells free from atmospheric air, which give them their buoyancy, and cause them to float in the sky.

Elihu, in his argument with Job (see Job xxxvii. 16) asked him and said, "Dost thou know the balancings of the clouds?" Of course Elihu did not know; as for Job, he was not, just then, interested.

Doubtless the cloud-forming cells are vacuum cells, free from air, without power to transmit light and heat, and so constituted that the cells may even run into each other before the rain descends, without destroying their vacuity. When they are in a body, or when there is a cloud of

them, they are, as is known, impervious to the light and heat of the sun.

Concerning the earthquakes, which occasionally happen, and in past ages have prevailed over the earth, we believe, and have long held to the theory, that they were primarily due to the agency and irresistible power of electricity. When electricity is accumulated under the surface of the earth and its free discharge or its circulation is suddenly interrupted, then of course something must happen, some change will come; there will be a shaking up, a catastrophe, the extent and importance of which will depend not only on the strength of the current severed, but upon its free connection with other currents, conductors or conduits arranged around the globe. A very short time is required for the electric currents to fly around the world. If the supply is continued and the current strong, then there will be not only great perturbation, but heat will be generated and accumulated. Great heat will consume anything combustible. The greatest heat that is known is electrical heat; and it will melt anything that can be melted. This electric fire will continue to burn, consume, melt and destroy, even in confined places deep down in the earth, where fire, requiring air, oxygen, or any one of the gases, will not burn; and where chemical materials will not consume. The irrepressible fire fed by the electric current is the only one that accounts for all the volcanoes now on the earth, or that ever have been: for their

eruptions in the past, for the tremendous flow of lava, melted minerals, rocks, and everything whose natural condition has been changed by the intense heat of the disturbed and broken currents.

Earthquakes, it is generally understood, precede the volcano. A "fault," as geologists call it, or a slip or break in the earth's strata, may occur from various causes; and if this occurs at a point where there are one or more strong and established currents of electricity below the earth's surface—a few miles more or less—the severing or breaking of the currents by reason of such fault or slip in the strata, or the sundering the current from any other cause, known or unknown, would create an immediate disturbance in the neighborhood of the breakage, by the unusual discharge of an enormous quantity of electricity at a high tension; and there being at the point no conductor adequate to carry off the extra supply of electricity; that element, not being disposed to lie quiet like water or other elements, would instantly begin to assert itself, and to shake the earth. There is, we may say, first a perturbation, a rumbling, and a shaking more or less violent, depending on the quantity of electricity thus irregularly let loose.

There was a period, during the geological formation of the earth, when doubtless the element had great sway, and did much in the formation, arrangement, and breaking up of the strata of the earth; during which period earthquakes and vol-

canoes must have prevailed. The earth bears evidence that there was a period when many great and destructive volcanoes were in active operation. The comparatively few volcanoes now scattered over the earth may be, and probably are, utilized by the Creator as safety-valves to regulate the supply of electricity circulating through the earth, preventing destructive earthquakes and other catastrophes, as the steam vent, or safety-valve, prevents explosions of the boiler.

81. *Nature's Safeguards Provided by the Creator.*—In the economic procedure of the Almighty there will ever be found, in all departments of His handiwork, checks and safeguards against destructive effects of the elements. These have been interposed for the security and welfare of all that may be concerned, and immunity from danger secured. Notwithstanding the innumerable flashes of lightning and heavy discharges of electricity from the heavens to the earth, it will be noticed how seldom there is loss of life or any injury suffered.

But more than this. It would appear that in His wisdom, He has endowed nature—if we may so express it—with a certain instinctive degree of self-preservation and power of recovery from mishaps, wounds, injuries, or loss of strength or vitality; so that the person, being, or animal, or even vegetable and material things, are soon restored to their normal condition; the truth of which statement may be readily ascertained.

In all parts of the earth, on the land and in all

waters, there may be discovered material laws adapted for the well-being of everything that is created.

In the early part of this century, a physician living and practicing in one of the New England states, promulgated the theory, and put it in practice, that it was a law of nature that she would do the best that could be done to restore to their normal condition any persons wounded or diseased; the success of nature's work depending quite largely on the nature of the trouble, and on the condition, treatment, and circumstances surrounding the suffering one. Nature would do the best that could be done to repair the injury, and restore health; requiring on her part, rest of mind, rest on the back, quiet, pure air and water, simple nourishment, freedom from care, etc., and then promising that health would soon be restored, unless there was some organic trouble. If a person was wounded, had a limb broken, finger nails torn off, it was claimed that, if bound up or cared for, nature soon heals the wounds, knits together the severed bones, replaces the torn off nails with new ones, thus doing, in these and many other respects, what man with all his wisdom, skill and power is unable to perform.

These conditions and results may be observed, not only in animal but in vegetable life, as the grafting of trees and other items prove. Observe the vine, how it feels around for support and clings to the barren wall. These, and similar

matters, are known to all observers of nature's ways.

This rule of nature, this salutary provision ordained by the Creator, will also be found to be a rule in operation in controlling electrical procedure and the interests connected therewith: that is, suppose one established current of electricity is, from some such cause as displacement in the earth's strata, broken, severed, or separated, and the current continues to flow; immediately perturbations of the earth ensue and will continue till the connection is restored. The lost ends seek, and soon find each other, make new connections and thus restore and maintain the regular flow as it was before the mishap occurred. An instance of this procedure took place August 31, 1886.

82-83. *Lessons Gathered from the Great Earthquake at Charleston, S. C.*—On the evening of that day, about ten o'clock, while conversing with my son in one of the upper rooms of my residence, No. 313 Clinton Avenue, Brooklyn, N. Y., he suddenly called my attention to the irregular movement of the pendulum of the clock: the next moment the distinct vibrations of the house made us realize that we were in the midst of an earthquake. The vibrations were so severe that the clock was stopped, as were two others standing on different mantels running east and west, the pendulums swinging in the same directions.

The next morning we learned that the tremor

of the earthquake had been felt over the greater part of the United States, but that at Charleston, and in its neighborhood, the vibrations were severe, and very destructive to life and property in that city; and the occurrence has ever since been known as the "Charleston Earthquake of 1886," the exact time of its occurrence being August 31, 9:51 P. M.

The greatest destruction of life and property occurred in less than thirty seconds. In that brief time over 6,000 buildings were wrecked or badly damaged, and not a single plastered interior in the city is said to have escaped uninjured. Ninety-two lives were lost, and hundreds were injured. The loss in money is estimated at over \$5,000,000. Hundreds of buildings that were either wrecked or badly injured have been photographed, and they form an interesting and instructive sight, though a very sad one. The history of the event is worth considering, though we have no room for details. The people were panic-stricken; the greater part fearing sudden death. Shocks, but not so severe, were felt for several days afterward; but finally the earth was at rest, and peace and confidence were restored.

The shocks were from the northwest to the southeast. Some witnesses state that "the ground began to undulate like the sea, accompanied by an awful roaring sound, and, in some places, by loud detonations like the firing of artillery. When the shock was in progress, the terrible din which

accompanied it arose unmistakably from the bowels of the earth."

Captain Jervey, a well-known and intelligent observer, states that "the waves or vibrations of the earth were not in long rollers, but had rather the appearance of ground swells in deep water." Buildings and blocks were moved as whole, making it manifest that the operating force was not near the surface of the earth but deep down.

The centre of the disturbance, where the shock was the severest, appeared to have been at Summerville, a village a short distance northwest of Charleston. At that place chimneys were thrown down, and houses flung from their foundations. In that neighborhood great fissures were made in the earth, and geysers were formed. A photograph of one of these geysers gives a clear idea of their appearance. Water, mud and sand were ejected from them in various quantities, the mud and sand remaining after the water had subsided. The width of a large fissure, at Cainboy, was reported to be fifteen feet. The report states further that "the electrical condition was highly disturbed."

The severe vibrations of the earth and the destructive work of the earthquake, were over in less than half a minute; and in that time the severed artery, or broken current of electricity, reestablished its connection; and in a few days it must have been complete, for then all rumblings had ceased.

The writer was very familiar with Charleston

and its surroundings, having spent a portion of his business life in that city, in the forties and fifties of this century, and erected for business purposes one of the storehouses on Hayne Street, which was among those injured.

As nearly as we have been able to ascertain, immediately, or within a few moments after the earthquake at Charleston, we felt its tremors in Brooklyn, 600 miles away; and the vibrations were felt northwest to the Mississippi River, and further south in Georgia. In a few days we learned from Mr. Clemons, at The Glades, Hall County, Ga., that the vibrations there were quite severe. All the facts relating to this noted shaking of the earth, disprove the theory held by many scientists that it was caused by an internal wave of molten material in the bowels of the earth; that a great movement of this molten matter in the form of a wave—like the waves of the ocean—rushing against the so-called "crust of the earth" caused it to vibrate violently, and shake down in a twinkling the buildings of a great city.

In considering this theory we remark that those who hold to the molten condition of the interior of the earth maintain that all material there, in whatever condition it may be, is and must necessarily be, under an intense pressure. That being so, how then could it be possible for any wave of molten matter of any size to be formed? The internal pressure would prevent the formation of any wave, for one requisite of

its formation is an open space corresponding to the open space given to the ocean for the formation and movement of its great waves; besides, there must be another element to operate on the material and drive it, as the waters of the ocean are driven by the force of the wind, the continued pressure of which produces the waves of the sea. Under the conditions named no wave could be formed in the interior of the earth, any more than one could make a wave in a hoghead of water, filled and bunged up. Then again, a wave moves in one direction only; but this so-called earthquake wave of Charleston moved in every direction, east to the ocean, south to Georgia, also west and north.

Also consider for a moment the immense velocity of the earthquake, its rapid vibrations, and how quickly it made itself known over the land. There is no ponderable nor imponderable material or element on the earth, or even in the universe, known to man, that could have travelled in the time and put forth the inconceivable power exerted and manifested by that earthquake, but the one inscrutable element, electricity, that everywhere pervades our solar system.

More than forty years ago, there stood in the city of New York, where the "Times Building" now stands, a church known as the Brick Church. It was sold and torn down to make room for buildings for business purposes. The brick walls were difficult to break or tear down; and when they came to attack the steeple, more

than one hundred feet high, the architect decided that it would be easier and less dangerous to throw it down, rather than tear it down brick by brick. He therefore planned to tear out the brick at the street level, taking out the brick and making an opening about four feet high, and inserting pieces of timber. This work was done for a little more than half the diameter of the steeple, and on the inner side, as it was planned to throw it inwards. When that work was done, charcoal and other combustibles were placed about the wooden supports, and set on fire, burning equally on the three sides. When the fire had destroyed the strength of the supports, the massive steeple, weighing hundreds of tons, began to lean, then fell inward with a tremendous crash, making the surrounding earth apparently tremble. As we had a desire to witness the event, we took our stand near the City Hall, saw it fall, heard the crash, and, about three or four seconds later, sensibly felt the jar made by the sudden and heavy impact of the material on the earth.

The point we would note here is, that any sudden and heavy blow made on or against the material earth, would be comparatively slow in communicating the knowledge and effect of that blow, to the other parts of the earth, near or remote. If, according to the old rule, sound travels about 1,100 feet per second, a sensible knowledge of the shaking of the earth at Charleston, 600 hundred miles away, if communicated by means of the natural earth only,

must have taken over one hour and a-half to have made itself known in Brooklyn, instead of the almost instantaneous knowledge of the fact of which we have abundant proof, making it evident that it was electricity that conveyed the intelligence with electric speed and power, and not any so-called internal wave under the crust of the earth.

The dynamo, or electric apparatus, gathering the electric fluid from the atmosphere, proves that electricity everywhere pervades the atmosphere; and, although it may not be called a part of it, yet it is an accompanying element, just as aqueous vapor is everywhere found in the atmosphere, though not a constituent part of it. Electricity pervades the air in a diluted condition, we might say, and is not perceived by us any more than we perceive either one of the two gases that form the atmosphere.

XVII

THE GREAT DELUGE

84. *The Great Deluge. Proof of the Fact, and Brief Account of it.*—There has been growing up among scientists and others of this generation, a spirit of unbelief in one great event recorded in the Scriptures, namely, that of the general deluge, by which the entire human race with the exception of the family of Noah, are said to have been destroyed for their wickedness. We read, Genesis vi. 4, 5, 11:—"God saw that the wickedness of man was great in the earth, and that every imagination of his heart was only evil continually. The earth also was corrupt before God, and the earth was filled with violence."

13th:—"And God said unto Noah, An end of all flesh is come before Me, for the earth is filled with cruelty through them; and behold, I will destroy them with the earth."

14th:—"Make thee an ark of pine trees; thou shalt make cabins in the ark, and shalt pitch it within and without with pitch." (Genevan Version.)

Gen. vii. 11, 12:—"And in the six hundredth year of Noah's life, in the second month, the seventh day of the month, in the same day were all the fountains of the great deep broken up, and

the windows of heaven were opened." "And the rain was upon the earth forty days and forty nights."

Gen. viii. 3:—"And the waters returned from above the earth, *going* and *returning*, and after the end of the one hundred-and-fiftieth day, the waters abated."

The Genevan version of the Scripture further records that "The waters waxed strong, and were increased exceedingly upon the earth, and the ark went above the waters, and all the high mountains that are under the whole heaven were covered. Then all flesh perished that moved upon the earth, both fowl and cattle and beast and everything in whose nostrils was the spirit of life and breath, whatsoever they were in the dry land, they died."

The account of the great flood brought by God upon the earth in the days of Noah, and the reasons why, are given in the sixth, seventh, eighth and ninth chapters of Genesis. The account is very simple, plain and definite, and bears on its face the evidence of its truthfulness.

This great and awful judgment on the old world is spoken of, and referred to, many times in the Scriptures of the Old and New Testaments. Let those inclined to disbelieve the scriptural statement remember that Jesus Christ has also testified to the truth of the record of the great flood. Christ says, (Matthew xxiv. 38, 39) "As in the days that were before the flood, they were eating and drinking, marrying and giving in mar-

riage, until the day that Noah entered into the ark, and knew not until the flood came and took them all away; so shall also the coming of the Son of Man be."

Jesus Christ is "the true and faithful witness." His testimony cannot be ignored nor denied. The world itself, aside from the Scriptures, contains evidences of the fact of the great Deluge. The Flood left no vestige of the hundreds of millions who lived on the earth before it came and swept them away; nor is there any trace of their works to show that they ever inhabited the world, though they lived in it for more than sixteen centuries; thus making manifest God's determination to sweep even the remembrance of these generations from the earth. Since that event, the history and distinctive marks of the leading families, tribes, or nations inhabiting the world, can be traced back to Noah and his sons. The history of no family or nation on the earth goes beyond Noah. Genesis x. 32 says, "The nations were divided in the earth after the Flood." The scripture records of the descendants of Noah after the Flood, are facts verified in history. The earth itself bears testimony that a great flood has washed over it. The old nations of the world have traditions and memorials of the great fact, the truth of which is verified beyond question.¹

¹"It is reported that Pere Scheil has made a discovery of a clay tablet. To be sure the record on the tablet does not amount to much, it is such a fragmentary bit; but it is large enough to make sure that the tablet contained the story of the

The patriarch Noah, having been dishonored by his grandson Canaan, who not being reproved by his father Ham, according to the opinion of expositors of the Bible, the inspired Noah being aware of what had taken place, uttered the following prophecy. Genesis ix. 26, 27: "And he (Noah) said, Blessed be the Lord God of Shem; and Canaan shall be his servant. God shall enlarge Japheth and he shall dwell in the tents of Shem" (shall come into all his privileges and blessings) "and Canaan shall be his servant."

The Rev. Dr. John Brown, a learned Scotch Divine of the eighteenth century, a linguist familiar with the ancient and modern languages of the world, and with all ancient as well as modern histories of the nations, author of a complete chronology of the Scriptures, and of the edition known as "Brown's Bible," which is in high repute, in commenting on this remarkable prophecy of Noah, writes as follows:

"These predictions are greatly extensive; almost every prediction in Scripture relative to the

Deluge; and, most fortunately, the most important part of all is preserved, the colophon, with the date.

"It is dated in the reign of Ammi-zaduga, king of Babylon, (and we know that he reigned about 2140 B. C.). That is, we have here a precious bit of clay on which was written a poetical story of the Deluge, five centuries before Moses, and about the time of Isaac or Jacob. That is enough to make the discovery memorable. We learn positively that the story of the Deluge was familiar to the common people of Babylonia, and therefore of all the East from Syria to Persia." (From the *New York Independent*, May, 1898.)

Egyptians, Canaanites, Tyrians and Zedonians is comprehended in this repeated curse of Canaan. Almost every prediction relative to the Assyrians, Chaldeans, Persians and Arabs, and especially what relates to the Jewish nation and Jesus Christ, is included in the blessing of Shem. Almost every prediction relative to the Greeks, Romans, Goths, Tartars and Turks, and especially what relates to the Gospel Church among the Gentiles, is contained in the blessing of Japheth. The fulfillment of these predictions is no less remarkable. Much of the Scripture of the Old and New Testaments, much of the history of nations, is no more than an account of it."

After this Dr. Brown proceeds to enlarge, and state many historical facts known to the learned, in proof of the complete fulfillment of the short, yet comprehensive prophecy uttered by the Patriarch Noah, making it evident that the history of no family, tribe or nation on the earth dates back earlier than Noah, who is the father of the human race now living on the earth.

Here is what we call an incidental, yet complete, historical proof of the Scripture narrative of the Deluge. Let unbelievers disprove these historical facts, or else hereafter forever hold their peace.

85. *Interesting Inferences.*—There are circumstances connected with the Deluge about which it may be well to inquire, although they do not contravene the fact itself. For instance, we read: (Genesis ii. 5, 6) "The Lord God had not caused

it to rain upon the earth. But there went up a mist from the earth and watered the whole face of the ground." The sterility of the ground and the labor required to raise food-supplies mentioned by Lamech (Genesis v. 29) would imply that no rain nor anything more than the mist fell on the earth until the Flood came. Additional proof of this view of the earth's condition at that period is found, or inferred, from the rainbow God gave as a sign, and which was first seen after the Flood. (See Gen. ix. 8-17.) "And I will establish My covenant with you, neither shall all flesh be cut off any more by the waters of a flood, neither shall there any more be a flood to destroy the earth. And God said, This is the token of the covenant which I make between Me and you and every living thing that is with you, for perpetual generations. I do set My bow in the clouds, and it shall be for a token of a covenant between Me and the earth. And it shall come to pass when I bring a cloud over the earth that a bow shall be seen in the cloud." The sun requires the rain-cloud on which to form his bow of beautiful colors.

From these facts it seems evident that there is a marked difference between the atmospherical phenomena of the present day, and what appears to have been previous to the Deluge.

In the Mosaic record, in the first chapter of Genesis, it will be noticed that no reasons are mentioned as to the causes or purposes for which the sun and moon were created. The purpose

which seems to have been the most apparent is named, and nothing more; as the sun, "the greater light to rule the day," and the moon, "the lesser light to rule the night," etc. Nothing is said of the heat and other life-giving influences of the sun, without which this globe of ours would be a dead world; so also the moon is mentioned as "the lesser light to rule the night," as if that were the only object of its creation.

We know that the moon, from its close proximity to the earth, has far greater power of attraction on the atmosphere and the water of the earth than the sun. The influence and power of the moon in this direction are so necessary and beneficial that it would seem that the world could better do without its light than its influence on the elements. Were it not for the power of the moon on the atmosphere and the water, as manifested in the great ocean tides, our oceans, bays and harbors would be like stagnant lakes and ponds. Our atmosphere would have less capacity to retain moisture, would be less invigorating, and would lack also other advantages.

86. *Was the Moon an Important Factor in the Destructive Work of the Deluge? Scriptural Proof that It was.*—In view of the facts stated, and the condition of the earth at the time, it may be well to inquire if, in bringing about the Flood, it is not probable that the Almighty caused the orbit of the moon to be changed, either directly, or by secondary means, such as the near approach of some comet or other heavenly body,

drawing or forcing the moon out of its regular orbit and making it revolve nearer the earth than before; the moon making then thirteen revolutions about the earth in a year, as it now does, instead of, probably, twelve previously. The immediate effect of such a change would be to give the moon an irregular or oscillating movement, at least during its first revolution about the earth. The effect of its near approach and irregular movement, would be an increased power to attract the earth; and its effects would be felt and perceived mainly on the elements, greatly disturbing them, causing besides, the floods of rain, the fountains of the great deep to be moved or broken up, and deluging the earth, washing over hills and breaking over mountain-tops, making great havoc with everything on the face of the earth. The Scripture record, in some versions, speaks of the waters "going and returning"; plainly describing the tidal movements of the waters caused by the attraction of the moon.

The effect on the earth, of the nearer approach of the moon to it, is to give it greater influence or power over the water and atmosphere of the earth, as is manifested in our ocean tides and the rain-storms which now prevail, and which were unknown before the Flood.

In view of the fact that rain continues to descend upon the earth in its season, watering and greatly enriching it, making sure abundant harvest returns, besides other innumerable blessings;

is there not good reason to believe that in the change made which brought on the Flood, the inhabitants of the new world are more blessed in many respects than were the people who lived before the Deluge?

For many years we have held the theory that our moon was an important factor in the work, and was used by the Creator to accomplish this end, and thus advance the welfare of the coming generations.

We were well aware that King James' version of the Bible gave no hint of any singular movement of the waters, save that the rains descended and the fountains of the deep were broken up; and thought it useless to look further in other translations for evidence in support of our theory; but lately it occurred to us to note the rendering of the text on this point as found in some of the old Bibles in our possession, and we were surprised to find that their versions supported our theory of the deluge.

We offer the following evidence of the fact: The Genevan version of the English Bible, quarto edition, and well known to all students of the Bible, printed 1560, translates the third verse of the eighth chapter of Genesis as follows: "And the waters returned from above the earth, going and returning."

The old English Bible known as "the Bishop's Bible," printed by Christopher Barker, London, 1585, in the reign of Queen Elizabeth, black letter, large folio edition, (interesting and valuable in

many respects) thus renders this same verse: "And the waters from the earth returned; going and coming againe, and after the end of one hundred and fiftie dayes the waters were abated."¹

From a copy of the *Biblia Sacra*, published in Hamburg, Anno Domini MDXCVI. (1596) (the Old Testament only in three volumes) Folio, printed in parallel columes, in three versions, the "GRECE, LATINE, & GERMANICE," we quote as follows:

"Et reversæ sunt aqua de terra, eundo, et redeundo, decreveruntq; aquæ in fine centum quinquaginta dierum."

(Translation) "And reversed are the waters of the earth, going and coming (flowing to and flowing from). The waters decreased at the end of one hundred and fifty days."

Those learned in the old Latin can translate for themselves.

Dodati's "Annotations upon all the Books," and most of the verses of the Bible; a work of many learned men, published in London, 1657, two large folio volumes, comments thus on the second and third verses of the eighth chapter of Genesis:—"Fountains of the deep." "To

¹ A copy of the "Bible, Old Testament and New translated out of the original tongues by His Majesty's special command." "Printed by Thomas and John Buck, (printers to the University of Cambridge) Anno Domini MDCXXIX. (1629) renders the verse the same as King James' version; but the marginal reading 'Hebrew,' 'in going and returning.'"

make the flood there was as it were a secret conspiracy¹ and concurrence of waters under ground, with the rivers and seas above, betwixt these there is such a commerce and communion that from the sea, the rivers run, and so they make their return again."

Third Verse:—"Returned continually." Heb., "going and returning."

"That is with all speed returning and recoiling to their proper place and channels from whence they were gathered to make up the flood; which sheweth their readiness to obey the command of the Creator."

"Text and margin." "So it sometimes maketh a flood to swell larger and sometimes (and that usually) it dryeth up small waters and lesseneth or abateth the depth of great ones."

The testimony of these several versions of the Scriptures well known and of high repute, all favor the idea, if they do not absolutely declare that there was a tidal movement of the waters of the flood a "going and returning" of the same, though they did not know then, the why and wherefore of this "recoiling" movement of the waters they recorded. Those learned in the Greek and Hebrew can ascertain for themselves the truth of these statements.

The most improbable item in the account of the deluge contained in King James' Version, we used to consider was the great height that the

¹ They did not know the moon was at the head of that so-called conspiracy.

waters rose, rising as mentioned above the tops of the mountains, which of course carries the impression that the valleys and oceans were filled up to that level. If so, how was the surplus finally disposed of? Years ago, we came to the conclusion that our moon was the principal factor in the moving of the waters of the deluge, and cause of all of its vast destructive effects, breaking up the fountains of the great deep, dashing and dragging the waters over the high mountains, as mentioned in the Scriptures. We did not then expect to find anything in Scriptures that would favor the theory, and it is only within a few years in looking this matter up, we unexpectedly found the evidence here given. This evidence, we hold is conclusive of the fact that there was, besides the heavy rain, a great tidal movement of the waters for about forty days, that was destructive in its effects. Admitting these facts, we see no physical reason why the truth of the Scripture story of the deluge should not be accepted.

87. *Condition of the World Before the Flood.*—The condition of the world and the history of mankind at the time of the Deluge and before it, as recorded in the Scriptures, is very short, and not easily comprehended. From the few facts given and the evident state of affairs that existed, we must reason out the state and condition of mankind and the world at the time.

The earth itself, before it was broken up, and much of its surface changed, or destroyed by the

great flood of waters, was doubtless very beautiful; with many an enchanting and delightful landscape that pleased the eye, and filled earth-born hearts with longing desires; an earthly paradise, just as it came from the hand of its Creator when He delivered it over to the first man to possess and control.

We learn from the record that in the early history of man, there were in that period two families or classes distinct in character from each other, yet living together in the habitable portion of the earth; one family, in its line, acknowledging God and His authority, aiming to do His will, obey and please Him; the other family, in its line, did not care for God, acknowledge His claims, nor seek to please and obey Him; but sought, rather, to gratify its own will and pleasure in this life, regardless of the future.

It is not probable that this distinct line of difference prevailed for any great length of time. In fact, the record proves that it did not, for the two families soon began to intermarry. Doubtless there were many internal conflicts as to "whether truth and principle should control, or love have sway;" probably ending in love having its way. Self-interest, worldly interest, and the gratification of present desires, were the motives that tended to rule the race; for Man, in matters of this world, is ever the same.

The lines of both families, running down the centuries, necessarily mixed together in many transactions and events; for they were together

in the world, and could not be taken out of it, nor be "kept from the evil."

It is reasonable to suppose that both lines were alike affable, sociable, intelligent and entertaining. The daughters of the world,—fair, attractive and enchanting—began to win the sons of faith, who were unable to resist their charms. Intermarriage of the lines began and was continued, until, in the thousand years or more that followed, all traces of difference practically disappeared.

It is not probable that intercourse between the families, with their discordant opinions, ran along smoothly for any length of time. On the contrary, differences of opinion would lead to conflicts more or less severe and extended. The weak would have to give away to the strong; the few, surrender to the many.

During the long centuries, there was many a wearisome conflict between individuals and communities. There was many a martyr to the cause of truth and right; and many a community of persecuted ones had to leave their homes for distant places, where they hoped to abide in peace. It was an age when self-interest, falsehood and wrong, triumphed over truth and right. Equity and justice were trampled to the earth. Unbelief, and hatred of truth and right, so prevailed, that in the thousand years or more, the whole world became as one family in sentiment, feeling and belief. The whole race preferred to please themselves, rather than God, their Maker. God was practically shut out of the world He had

created; and out of the hearts of men and women, His offspring. The world was bright and beautiful, life was long and had many attractions; and the race of men and women that then lived determined to possess and enjoy all they could get out of the world.

It is not reasonable to believe that the race of mankind living before the Deluge was ignorant, unlearned, or at all like savages. It is more probable that they were well advanced in knowledge, in the arts, and in many of the so-called sciences. For 900 years they had Adam, who was taught of God, and who had sufficient wisdom to give good and correct names to all animate and inanimate things; and to teach his children knowledge. They also had the patriarchs, who taught by precept and example. The world had then but one language to wrestle with; probably the Hebrew. The Scriptures state that "man sought out many inventions," "that they built cities," that "Jubal, one of Cain's descendants, was the father of all such as handle the harp and organ;" and "that another of his descendants was an instructor of every artificer in brass and iron." We hold that men of that day were well advanced in science and the practical arts. Even Satan, as far as permitted, would advance his children in all worldly wisdom.

King Solomon wrote, as recorded, "There is no new thing under the sun, and is there anything whereof it may be said, 'See, this is new?'"

It hath been already of old time which was before us."

From a worldly point of view, the men of that age were not fools; doubtless many were men of ability, worldly wisdom and prudence.

The Scriptures state that "there were giants in the earth in those days;" giants in mind as well as body; also that "when the sons of God came in unto the daughters of men, they bare children to them, and the sons became mighty men, which were of old, men of renown;"—men of famous deeds, of great performances. Their deeds and names, however, are now lost to the world. Able writers of this day might picture vividly some of their characters and deeds. They were mighty men, celebrated, probably, in every branch of human industry and life. There were men doubtless skilled in the art of war, a favorite pastime for the period; for proud, ambitious, selfish and tyrannical men prevailed and held sway; men as generals, more noted and successful in their careers than Cæsar or Napoleon, who led large armies and gained great battles.

Before the advent of the Flood, there must have existed on the earth a population of many hundred millions of people. Doubtless many of these antediluvians were possessed with the spirit of enterprise and discovery, were skilled in the art and practice of navigation, sending out their vessels, large and small, over the seas and oceans; planting colonies in the islands, and on continental shores; going even as far as Central Amer-

ica, during the 1,600 years which that growing multitude occupied the earth.

When we consider the progress the world has made since the beginning of the sixteenth century, and especially during this nineteenth century, we ought to be willing to admit that the antediluvians may have accomplished far more than we have ever given them credit for doing. It pleased the Almighty to destroy, not only the whole race, but also all their works. The destructive force of the Flood was so complete that the "places that once knew them, knew them no more."

It is recorded that "God saw that the wickedness of man was great in the earth. The earth was corrupt; for all flesh had corrupted His way upon the earth. The earth was filled with violence."

The devil had mankind well in hand, and his principles of evil were thoroughly worked out in this period of wickedness, corruption and violence; which are elements that he well knows how to manipulate.

During the centuries of corruption, violence, wrong-doing and persecution that prevailed, the good, wise and prudent would, when possible, to escape tyranny, persecution and the sword, flee away, hiding themselves in the caves and dens and other secret places; and so became what are known as the "cave-dwellers of the earth."

During the 100 years in which Noah was employed in building the Ark, the race, with com-

paratively few exceptions, regarded him as a weak, simple-minded, credulous old man; and his building, a work of folly. The unbelievers maintained that such an event as a flood great enough to drown and destroy all the living on the earth, was an unheard of thing, without reason, and simply impossible. Noah's work was ridiculed, and his craft laughed at; men declaring that the thousand vessels that they had built, and which then traversed the seas, would stand any storm that might come, and that they would much rather trust their lives in the vessels they had made, than in Noah's unwieldy craft, which was without masts, rigging, sails or rudder.

XVIII

THE SUN

88. *The Sun. A Brief Description.*—In stating our views of the varied processes employed by the Creator during the many long periods in which the earth was being formed or built up, it was not at first our intention to make any particular mention of the other bodies forming our solar system; but as our sun was in existence before the earth, and is now the head and centre of the system, controls all its members, and supplies all with heat, light and electrical power, and probably with many other blessings not perceived; and as our earth is dependent on it for all these things, even for its very existence, it is necessary for the proper completion of our work to state some of the items wherein we are dependent on, and interested in, that great luminary, the bright "Orb of Day."

For a full description of the sun, what it is and what it is doing for the solar system it controls, we refer our readers to the current astronomical works, which state numerous facts and interesting items in full detail. For our present purpose, it is necessary to give a few important facts only, relative to that great globe, as we find them in the works of the astronomers.

The distance of the earth from the sun is 92,-

900,000 miles, and it revolves about it in 365 days. The diameter of the sun is 865,000 miles, and the circumference, about 2,600,000 miles. In size and weight, it is about 700 times greater than all the planets, including their satellites. It is about 1,300,000 times larger than the earth, though its density is not one-tenth that of the earth. Its density is also much less than that of any other member of the system. The sun rotates on its axis once in about twenty-five days and twelve hours.

The earth, at the equator, moves through space 1,000 miles per hour; while the sun, at its equator, moves through space over 4,000 miles per hour.

The sun is a perfect globe, its equatorial and polar diameters being the same, though, according to Laplace's "Nebular Hypothesis," it ought to be greatly flattened at the poles.

Experts with the spectroscope state that the sun gives no evidence that oxygen and nitrogen form a part of that great luminary. So far, it seems practically impossible to ascertain the nature of the elements that enter into the material composition of the sun; though, from the grand effects the sun displays, and the work it accomplishes, it is evident that the elements employed, in their simplicity, power and effectiveness, manifest the wisdom of the Creator.

All the planets revolve about the sun in the same direction, and on the same plane; which is precisely that on which the sun turns on itself.

The planets nearest the sun, as is well known, revolve about it in much less time than those farther away; but they also travel much faster in their courses; as for instance, Mercury, nearest the sun, travels ten times faster about it than Neptune, the planet furthest away.

The sun controls the earth in its movements about itself, and also imparts to it the light, heat, electricity, and all other life-giving influences it enjoys. The weight or specific gravity of any material on the sun is far greater than it is on our planet. A stone weighing one pound on the earth, weighs twenty-seven and one-half pounds on the sun, and only three ounces on the moon.

It has been ascertained that light takes only eight minutes to travel from the sun to the earth, and heat comes with it in the same time. The quantity and degree of light emitted from the sun is incalculable: no figures can convey to our minds an adequate idea of the amount. In intensity, it far exceeds the strongest electric light which man can produce. So also is the volume and degree of the heat generated in the sun and thrown off to the outermost bounds of the system, beyond our thought or comprehension. The sun throws its light and heat straight out from its surface in every direction; also its positive electricity, for which the negative planets and their satellites have a strong affinity and attract the inscrutable fluid in straight and probably also in converging lines; conveying or driving in its train the light and heat of the sun.

The Creator, who is an economical Being, and who has designed and measured all the elements, their place and work, provides and secures the greatest benefit that may be derived from each, as the plants and flowers naturally turn their leaves and faces to the sun, taking in their full measure of its light and heat.

The sun is called by some astronomers a "great magnetic body." It doubtless is the source of the electricity and magnetism that pervade our earth and solar system.

89. *Its Spots Determine the Period of its Revolution.*—Spots on the sun are known to exist; and to be quite numerous. These spots differ in size, and are comparatively small, considering the size of the great luminary. These spots are known to change in size, dividing into two or more. "The spots are dark, and seem to be deep down or in a cavity of the sun's surface. Sun spots disturb the magnetic needle on the earth. By the careful observation of these spots, proof has been obtained of the fact and time of the sun's rotation on its axis; namely, twenty-five days and five hours."

Quoting from the "Story of the Heavens," by Sir Robert S. Ball, LL. D., "the visible surface of the sun is not a solid mass—is not even a liquid mass,—but that globe, so far as we can see, consists of matter in a gaseous or vaporous condition. It would appear as if the luminous surface of the sun were composed of intensely bright clouds suspended in a darker atmosphere.

During a total eclipse, mighty prominences of great brilliancy are seen to leap from the surface of the sun upward or outward, thousands, even hundreds of thousands of miles, with great velocity, estimated sometimes 100 miles and over in a second, most wonderful to behold."

Astronomers give abundant evidence that the whole surface of the sun, at the poles as well as at the equator, is greatly agitated without intermission by great eruptions, violent explosions of great magnitude, enormous masses of gaseous material of bright light thrown up vertically, sometimes in fantastic shapes, spikes of light thrown outward for a great distance, besides many other items relating to the sun, which we cannot comprehend and which we would not believe if the facts were not demonstrated by the perfect instruments of the astronomers. The wonderful phenomena that the sun exhibits are beyond description, and must have an adequate cause, and be maintained by power and means that are inexhaustible.

Elements must be there of which we have no definite knowledge, either of their component materials, or of the combinations they make instantly with other elements, or of the conditions by which they may, by an impulsive force, be violently and instantly separated, with the resultant effect of a tremendous development of light, heat, and a discharge of electrical energy. All the elements in use are subject to law and orderly control.

90. *Probable Procedure of the Material Elements in the Sun.*—The material elements in the sun, producing the grand effects and results known to all, must be chemical elements of well-defined character, probably gaseous in their nature, possessing a strong affinity for other elements, forming quick or instantaneous combinations with them, and, under certain conditions, probably making solids, falling down from the far upper or outward regions of the sun, like hail from the clouds in a violent electric storm, then sinking deep down into the condensed elastic gaseous elements of the sun, until it reaches another strata of a different character that violently repels and throws it back far out from the surface, when again it meets with conditions that cause it to explode promptly as before, developing anew the condition of light and heat, and generating fresh electrical energy.

This supposed line of procedure, here indefinitely marked out, goes on, and is going on, apparently forever, following the lines of chemical and electrical operation. Attrition, combination, contraction, disintegration, expansion, violent explosions, ever developing the conditions of light and heat, and generating the electrical energy that prevails everywhere in the solar system.

The same material or chemical agents are used over and over again continuously. As the moisture, ever being drawn up by the sun, comes back to the earth as the gentle dew, heavy rain, or destructive hail, so likewise the material elements

in the sun, carefully and wisely prepared by the Creator, ever go through the process He has prepared, obeying the law He has made, to serve Him in His universe.

Solomon well understood the matter when he wrote, "All the rivers run into the sea, yet the sea is not full; unto the place from whence the rivers come, thither they return again."

Were it not for this law of return and compensation, the earth would soon be deprived of its rivers, and the world would become a dreary waste. If God hangs a lamp in the skies to light up the heavens, He will not let it cease burning for lack of oil.

91. *The Sun an Independent, Self-sustaining Body.*—In our thoughtful investigations for years past, of the nature and resources of our sun, the great globe that controls our solar system, we have concluded that that body was designed and made by the Creator to be, and in fact it is, a self-sustaining sun; that it has, in itself, all the elements of self-independency; that it is self-sufficient, able to supply bountifully all the light, heat, electric and other life-giving influences that any one or all the planets together require; that the Creator has supplied it with all the peculiar materials necessary to produce the effects and accomplish all the beneficent work it is doing. We also believe that He has also made wise laws to govern and control it in all respects, in its limitations great or small; that in the exercise or development of its attributes, it shall ever be

salutary, steady, and so uniform that the countless millions beholding it will ever trust in its benign influence. It may be called a true reflector of the wisdom and goodness of its Creator.

It is not reasonable to suppose that the all-wise and infinitely powerful Creator would make our sun, and the infinite number of suns known to be in the universe, to do the important work we know they are, and ever must be doing, and then suffer them to be subject to contingent resources and an uncertain supply of material, and thus be liable to deteriorate, and gradually burn out, at a period when most wanted. No, that is not His way. He who is from everlasting to everlasting, the Unchangeable One, has not created and established His universe to deteriorate and go to pieces. Changes there will be, as He has declared; but they will occur at the time and in the way He has appointed. If the sun ever ceases to burn, it will not be because it is exhausted, but because its Creator has determined to make the change, which, when it comes, will do so, probably, without much warning.

92. *M. Flammarion's Opinion of the Sun.*—Camille Flammarion of France, the author of the "Popular Astronomy" previously referred to, is careful not to mention the Almighty, nor at any time to give the great Creator the credit of doing anything in the universe. The book pleased the French people, was adopted in their schools, and we understand that the author was awarded the sum of 100,000 francs for it.

M. Flammarion gives a number of reasons or causes for the heat of the sun. We quote from his remarks, on page 298. "And how is this light and heat kept up? If the sun were composed of massive coal, burning in pure oxygen, it would not burn for more than 6,000 years without being entirely consumed; it would then have been burned out since the beginning of historic times."

This statement is in the line of proof that the consumption of material substance would not and could not maintain the heat of the sun. He and other astronomical writers mention the fall of comets and meteors into the sun as material that greatly helps to maintain its eternal fires. It is not probable that all the comets, meteors, stardust, and other bodies that might fall into the sun for 100 years, would maintain its fires for an hour.

M. Flammarion goes on to say, "But it is absolutely certain that it will become extinct, and that terrestrial life, of which it is the sole source of maintenance, will then be lulled into an eternal sleep. In all probability the sun will be extinct before 20,000,000 years."

What does he know about it? His theory is all mere guess work. The change will doubtless come as predicted, but not in the way M. Flammarion expects. His immortal spirit will be in existence, and he may witness the grand event; but from what point or place he will view the great catastrophe it is hard to say.

As we have already stated, we hold the sun to be a self-sustaining globe, provided by its Creator with means to support and maintain itself in the state in which it was when first created; and that all its materials are subject to laws that will ever produce comparative uniformity in all important respects.

93. *Not An Atmospheric, But a Vacuum Condition Surrounding the Sun.*—In regard to the state and condition of its surface, it is probably free from any gas or air possessing weight, like the atmosphere that surrounds our earth, for the reason that, if there were such an atmosphere or resisting fluid, it would greatly limit, if not prevent, the wonderful phenomena that are produced and reproduced every moment all over that great globe. Here on the earth, if we fire a ball from a rifle into the air, the resistance of the atmosphere soon stops its progress. But on the sun, burning gas, and light materials, are fired upward and outward in every direction, tens and hundreds of thousands of miles, without apparent resistance by anything like our atmosphere. There are other reasons that might be given in support of this view, viz:—that there is surrounding the sun a vacuum condition, an empty space, void of matter or anything that would float or sustain matter, or that would resist the free outward flow of all ponderable or imponderable agents, or their free and immediate return to the body of the sun to be used over and over again. The specific gravity of the sun,

being more than twenty times that of the earth, would bring back to itself any material that was forcibly thrown out, no matter how light it might be. Besides this vacuum, or rarified condition, would favor all electrical phenomena, according to statements made lately by Tesla, that master in electricity.

94. *Why Does the Sun Turn On Its Axis?*—Leaving these and some other matters that might be considered, we would mention one that ought to be solved if possible, and that is, why does the sun turn on its axis, and by what means is its uniform rotation maintained?

For more than ten generations it has been well known that our earth turned on its axis, and that a day and a night marked the time it took for one complete revolution. But why it should turn, and what was the power that maintained its uniform motion, has been, and is even now, more or less of a mystery.

Since it has been discovered and demonstrated that our sun itself rotates on its axis once in about twenty-five days and five hours, the questions arise, why and by what power, does the sun, that great globe that is 700 times larger and heavier than all the other bodies together, in the system revolving about it, turn on its axis and keep up its uniform motion?

The substance of the answer that has usually been given to these questions is, "that the great Creator, when He formed these bodies, placed them in their positions and gave them their

special work to do, issued His fiat and said, 'Let them rotate upon their axes'; and said to the planets, 'Let them revolve about the great sun in their appointed places and in the period fixed for them to finish their annual courses.'" And so these heavenly bodies, being thus duly started on their courses, and operating in empty space, where there are no resisting elements, do continue, and will continue, to revolve in their courses until the great Creator directs a change.

All this sounds very well, and may be absolutely true in many respects for aught we know, but when we consider that it must take an incalculable degree of power or force to keep even our inert earth rotating at the equator 1,000 miles per hour, to say nothing of the sun, revolving at its equator 4,000 miles per hour, and when we remember that it is a natural law for material bodies to lie inert, it will be well to look for some other cause for the uniform and rapid movement of the heavenly bodies, besides the absolute fiat of the Almighty. From the Scriptures, from His Providence, and from all His works in the whole realm of nature, we learn the invariable lesson that He is not only a "God of ways, but also of means;" and that wherever and whenever He plans a way, He provides the means, though the means may not always be discerned by man.

As we have, from time to time, considered the cause and power that kept the heavenly bodies in motion, we have concluded that, for our earth at

least, there was some internal arrangement located probably at or near its centre; some materials or elements of power, wisely arranged in all respects, and endowed with power and means of controlling the same, as the springs and mechanism of a watch regulate its movements. We have also further concluded that the elements of electricity and magnetism, that prevail so extensively over the earth, are the powerful elements which give that body its rotary motion, that give and control its daily revolution with perfect precision. The combined element, electro-magnetism, is now doing more for the earth than man can realize.

But when we contemplate the great sun that controls all the bodies that revolve about him and provides for all the members of the great family to which we belong, we wonder at the amount of work he is called upon to perform, and the immense power he must exercise to accomplish it.

The question is, wherein lies his giant strength? We know the sun is sometimes called "an electric body," "a great magnetic globe." We believe that the sun supplies our earth with electricity, as before stated, and also all the other members of the system. We believe also that this all-pervading and powerful element, electricity, or electro-magnetism, is the power in action that causes the sun to rotate on its axis and maintain its uniform motion. But just how the power was applied, we are not able to decide.

95. *Electro-magnetic Currents Probably Give Motion and Power to the Sun.*—We learned, a few years ago, from one of the electrical publications, a fact or law relating to electric and magnetic currents that had not previously been apparent to us. On realizing the force and extent of the application of the law as laid down, we were more than ever convinced that it was the electro-magnetic currents that caused the sun to rotate on itself, and maintain its uniform motion age after age; that the sun might, in fact, be truly called an "immense dynamo."

Quoting from a work published by the Electric Publishing Co., New York, the law, as stated, is as follows:—"Let it be understood that a wire or any conductor having a current of electricity passing through it, has lines of magnetic force passing one way around it, and the number is in direct ratio to the quantity of current passing through the wire. This magnetic effect is strongest close to the wire and decreases inversely as the square of the distance."

This extract, stating definitely an ascertained fact, shows that there is a perfect union in action of the two elementary forces, electricity and magnetism, which, in their combination, form a wonderful system for the development and use of their combined energy. It is a most singular procedure. It appears to be like a mechanical contrivance, the electricity being the shaft, and the magnetism the pulley, to which is attached the belt for driving the machinery.

96. *Statement of Plain Procedure.*—Then let us consider these two elements as being located in the centre of the sun, the electric passing from pole to pole and the magnetic currents passing around it, as described; and both currents being supplied in quantity and force in proportion to the magnitude of the sun, and the work required of him, both elements combined, operating in the fullness of their strength, yet quietly, unnoticed, "their voice not being heard," free from all friction or disturbance, turning the vast globe, and ever maintaining its uniform revolution on its axis regardless of any extra effort that it might at times be called upon to put forth in order to accomplish perfectly its appointed work. We say that when we endeavor to realize what is done, and how, we are lost in wonder and admiration at the simplicity of a contrivance so effective in its operation, and which manifests so clearly the wisdom of the Creator who designed and perfected the plan.

To repeat: "The electric current passing through the centre of the sun has lines of magnetic force passing one way around it, and the number is in direct ratio to the quantity of the current passing through it." "The work done by electricity is done by the magnetism surrounding the passing current, and not by the electricity itself."

The electric currents passing through the centre of the sun from pole to pole, may have their return currents at or near the outer surface of the sun 300,000 miles or more away from the centre.

In their return, other ends may be accomplished in their dispersion through the system.

97. *Electro-magnetic Currents Employed Probably to Give Rotary Motion to the Planets.*—Our conclusions of the ways and means in operation for maintaining the sun's rotation we believe will bear investigation.

The same principle and means we also hold to be in operation on our earth and the planets that rotate on their axes. Some planets that do not rotate may have within them the means provided, resting in a dormant condition until the time arrives for their use, which, as we have before stated, was probably the condition of our earth when there was no diurnal revolution. In this condition the planet Venus is now probably abiding. It must be remembered that the plan named relates only to the diurnal revolution of the bodies named. This mode of procedure is not adapted to sustain the revolution of the planets about the sun, nor satellites about their primaries. That is an entirely different matter.

98. *What Power Gives Motion and Maintains the Planets in their Orbits About the Sun?*—The important question therefore, now is, what power gives and maintains the planets in their orbits about the sun? Electric and magnetic power will not do this work. It is not adapted to it. That power is effective only when near by, according to the law. "This magnetic effect is strongest close to the wire, and decreases inversely as the square of the distance."

To keep the planets in position and in uniform motion, according to the laws Kepler has laid down, requires a power or force under law, ever the same under similar circumstances or conditions.

There is one power that rules in the world, in our solar system and doubtless in the universe, belonging to or inherent in matter, ever constant, everywhere asserting itself, that cannot be produced, destroyed, nor its sovereignty ignored; and that is gravity, the power and attraction of gravitation.

It is admitted that there are two forces controlling or operating on the planets in their circuit about the sun: one, the centrifugal, that impels the planet to fly away from the sun, and the other, the centripetal (attraction of gravitation), that causes it to gravitate to the sun the greater body. These two forces, as is well known, equalize each other, maintaining the planet in its appointed orbit while swiftly moving about the sun.

This is one of the great wonders of the starry heavens. Imagine the earth, for instance, flying in space around the sun about 60,000 miles per hour; it is kept from flying off at a tangent by the attraction of gravitation, and from falling into the sun by centrifugal motion. This force that holds the earth to the sun is beyond our comprehension. The force that holds the moon in its orbit about the earth is more than we can understand. All the smiths in the world are not able

to forge chains sufficiently strong to hold the moon in its orbit, even if they could be fastened to it, the force of gravitation being suspended.

99. *The Force of Gravity of the Sun is the Power that Moves the Planets in their Orbits; and that, too, in Periods Proportionate to their Distance from the Sun.*—After long consideration we have come to the conclusion that it is the inherent power of gravitation, with which the Creator has endowed matter, that not only holds the planets from flying out of their orbits, but moves and maintains them in their regular and uniform courses about the sun.

If this is so, the question is, how is it accomplished? In this matter it appears that heretofore we have given or allowed gravity but one duty to perform; and that was to keep the planets from flying away from the sun. That is, gravity was the centripetal force that just equalled the centrifugal force; and, having done that, its work was completed. It will be admitted that this attraction of the sun for the planet must inevitably be very great; and that this attractive power of the sun is and does act as a positive grip on the planets, a grip which it will not release. There is no chance about this complex work of gravity. The forces are all measured, and are, in their operation, as exact as any mathematical problem.

This force of gravity, as is known, is all-penetrating and all-pervading: every part of the sun lays hold of every part of the planet, and moves it along with its effective current. It is an attri-

bute of matter unseen and unfelt, yet everywhere asserting itself; a positive power unlike any other. The sun, 700 times larger and heavier than all the planets combined, turning on its axis in the strength of its might, carries with itself on the same plane and in the same direction, all the planets and satellites that revolve about it in our solar system.

The sun does not move the planet around it in the same time it takes to turn itself, as if there were a fixed and positive pole or lever connecting the sun with the planet. There is what might be called a slippage of the belt, a swift passing of the sun's attractive current over every atom of the planet, exerting its due influence, moving the planet along in its orbit, just as a breeze striking the sails of a ship, moves it through the waters; but it is apparent to every observer that the ship does not move as fast as the wind. If the wind is blowing twenty miles per hour, the vessel does well to make ten. The nearer a planet is to the sun, the stronger is the sun's hold on it, or control over it; and therefore the period of the planet's revolution about the sun must be less than if it were further away, gravity ever asserting its due power, as the facts of astronomy prove.

Mercury, the planet nearest the great orb, completes its circuit in eighty-eight days: Venus, the next, in 225 days: next, the earth, in 365 days. Neptune, the last and furthest away, being over 2,700,000 miles from the sun, takes 165 years to complete its orbit; thus making it evi-

dent that the farther away a planet may be from the sun, the less power it has to move it in its orbit. The fact remains that all the planets in their movements are controlled by the sun.

The same rule applies to the satellites. Each one is controlled by its primary; the planet to which it belongs. We believe that, for the planets, there is the same internal arrangement or plan of procedure provided that prevails on the sun, though in a far less degree. That is, our earth is under the influence or power of an electro-magnetic force that turns it on its axis; and then the earth, by its gravity, or attraction, or gravitation, holds the moon in its control, and moves it about in its orbit as the sun moves the earth.

The moon, the "maidservant" of the earth, created to serve it, does not need any system of diurnal rotation, for the Creator has not seen best to provide any.

Jupiter, the largest planet in the system, diameter about 87,000 miles, rotates on its axis in about ten hours. It has four satellites; one revolving about it in forty-three hours, another in eighty-five hours, another in seven days and four hours, and the fourth in sixteen days and seventeen hours. These satellites are comparatively small and are near the great planet. The attraction of gravitation, therefore, is so strong, and has such control over them, as to force them to make their revolution about their primary in the short time named.

The planets that do not, or are not known to rotate on their axes, may also be supplied with the electro-magnetic apparatus for diurnal revolution which, for the present, may be held in abeyance until their use is required by the Creator, which, as we have before stated, we believe was the case with our earth during the long periods of its geological formation.

If we did not know that the sun turned on its axis, we could not say that it influenced the planets in their annual revolutions about it, but in this day, the rotation of the sun on its axis is an ascertained fact.

100. *The Sun Requires Great Power to do its Work. It is an Immense "Driving Pulley."*—It would be well to consider for a moment not only the very great power required to keep the great globe in its own uniform rotation, but the extra power it must put forth to keep all the planets revolving about it in their regular courses and uniform motions. Some idea of the great size of the sun may be obtained if we consider the centre of that tremendous globe placed where our earth now is; and then remember that *one-half* of its diameter will fill up all the space between our earth and the moon, besides extending about 200,000 miles beyond the moon.

It would appear that the utility of the sun's rotation on its axis has hitherto escaped notice; but when this fact is realized, the wisdom of the Almighty in designing and ordering this important procedure, so simple and so effective, must be

apparent to all intelligent minds. Our sun proves to be a great and powerful dynamo. It is the immense "driving pulley" of the solar system, that keeps all the planets in motion.

It may truly be said of our sun, that, in the entire physical universe there is nothing to equal it in wisdom of design, utility, power and glory; and that therefore it may be accepted as God's master-work of creation.

XIX

THE PLANET MARS

101. *Interesting Items Relating to the Planet Mars.*—But here comes the little planet Mars; and we must not pass it by, for at this late day it has a wonderful story to tell. From the astronomers we learn that there are no two planets alike. Perfect uniformity is not the rule for the stars; they all differ in glory; as among a hundred maidens that might be gathered together, every one beautiful, graceful and charming, yet no two would be found in all respects alike.

"Mars is the planet nearest to the earth in the outer circle: it is 4,000 miles in diameter, and rotates on its axis in twenty-four hours."

We quote from an astronomical work describing that planet; "There are circumstances which strongly suggest that water may be found on that globe. At the poles of Mars are large white regions, and it has been surmised that they are due to an accumulation of ice and snow on the polar regions of the planet. On some occasions, indeed, an ice cap on Mars, with its brilliancy and its sharply defined margin, is a striking picture in the telescopic view of the planet."

We have never given any credence to the idea that the white regions seen at the poles of the planet were due to their being capped by ice or

snow; for these elements have no superior capacity to reflect light, at the best, more than a few thousand miles. They have not the inherent light possessed by electricity, or bodies highly electrified, that may be seen at a distance of 50,000,000 miles.

We have always held that the light or white appearance seen at the poles of Mars was due to some electric phenomenon, similar to the polar lights, or "Aurora Borealis," always prevailing in the Arctic regions of our earth.

The most probable theory of the "Aurora Borealis" is that originally given by Franklin, viz:—"that it was due to electric discharges in the upper regions of the air."

But in recent years something more interesting has been discovered relating to the planet Mars, which has been the subject of much thought and speculation. Mars had heretofore been described in the books as one of the planets that had no moon nor satellite. But lately it has been definitely ascertained that Mars has two satellites; that they are small; and that Mars hugs them so close to himself that it has been a difficult matter to find them. The honor of having discovered these moons belongs to Professor Hall, of the Washington Observatory, Washington, D. C.

The discovery was the result of a diligent and persevering effort, combined with a perfect knowledge of the situation, and just what was required to accomplish a determined purpose. If Mars had any satellites, Professor Hall was re-

solved to know it; and he found them, though they were small and close to the planet as we have said.

The larger of the two is twenty-two and one-half miles in diameter, 16,500 miles distant from the planet, and revolves about it in thirty hours and eighteen minutes, about six hours more than Mars takes to rotate on itself. So far no new rule or principle appears to be involved.

But the small satellite, about eighteen miles in diameter, and 4,000 miles away, revolves about the planet in seven hours and thirty-nine minutes, flying around more than three times while the planet is revolving once.

This appears to be something new in nature. There is nothing like it known in the solar system, where a satellite revolves about a primary in less time than the planet turns on its own axis.

Can this new course of procedure be accounted for; and if so, how? There is one way in which we would account for it, and if true, as we believe, it will fully explain the movements of the satellites of Mars; and that is, that the planet itself is a large dynamo, though small in comparison to the sun; and that this is so, is made more apparent by the fact that the polar lights of the planet make it manifest that he is under the influence and power of electric currents: that is, that there is passing through the centre of Mars a current of electricity which, according to the electro-magnetic law, has a current of magnetic force passing one way around it in direct ratio to

the quantity of electric current through the wire or centre of the planet.

As this magnetic current is strongest close to the wire or electric current, and decreases inversely as the square of the distance, therefore these satellites of Mars, being in close proximity to it, and under the influence of this magnetic force, are carried around it faster than the planet itself rotates.

If the satellites were 30,000 to 50,000 miles away, they would be beyond the magnetic force, and would then revolve steadily about the planet, being carried around it by the power or attraction of gravitation that reaches out everywhere; revolving on the same plan of procedure on which our moon is caused to revolve about our earth.

XX

CONCLUDING REFLECTIONS

101. *A Reminiscence.*—In early life, the writer, being induced to leave his father's home in old Fairfield, Conn., came to the city of New York and was soon employed in a wholesale dry goods house in Cedar Street, making his home in Brooklyn, since which time that city has been the place of his residence, and also that of his family, since he has had one.

Brooklyn, as is well known, has always been practically a part of the greater city of New York, separated from it only by the deep river that connects the waters of Long Island Sound with the ocean. The greater part of the residents of Brooklyn had their place of business in the city of New York, going over in the morning, and returning in the latter part of the day. For years they were transported across the river in slowly-moving ferry-boats; but of late years the ever-increasing crowds of people have had, in addition to the ferries, the use of the great and widely-known Suspension Bridge that now connects the two cities.

After the writer's arrival in New York, it was not many months before he learned that the city possessed institutions that offered to young men advantages not to be had in the country. The

one that particularly attracted his attention, and from which he soon began to reap benefit, was the "Mercantile Library," then conveniently located in Clinton Hall, on Nassau and Beekman Streets. The Library was well stocked with interesting and valuable books; and, in addition, had a reading room containing books of reference, and was well supplied with leading literary, scientific, and astronomical magazines, quarterlies, reviews and other periodicals, principally English, in which financial and many other questions of the day were discussed. It also had several Mechanical Journals, containing descriptions of the new inventions and discoveries that were being made, most of which attracted his attention. Besides the above, there were delivered, during the season, interesting and valuable lectures by men of learning and ability.

The writer took pleasure in investigating the financial questions of the day, and also, what was new in astronomy.

103. *Theory of a "Central Sun."*—At that time there was, in one of the magazines, an article maintaining the theory of what is known as the "Central Sun." Some so-called astronomers held the theory that the fixed stars, as they were called, were suns, which, together with their supposed planetary systems, revolved about one great "Central Sun"; maintaining, because of the universal law of gravitation, that of necessity there must be one such body in order to preserve the equilibrium and orderly movement of the

celestial bodies, and prevent them from coming into collision, or congregating together.

The theory was simply an extension of the plan of our own solar system; our sun controlling the movements of all the bodies revolving about it, keeping them in their places and thereby preventing destructive collisions, etc.

The question whether or not there was then such a great controlling body in the universe, engaged the writer's thoughts; and, after a definite consideration of the theory, he concluded that there was no such body, for reasons, in brief, that if there were such a central sun, it could not be hid, and therefore must in many ways be made apparent to all solar systems it controlled; as our great sun is visible to all the planets and other bodies revolving about it. Besides, the theory as a whole was incongruous, and might be considered a disparagement of the wisdom of the Creator.

But if the law of gravitation is held to be a universal law, as it is now believed to be, then the question remains, how or by what law or power are the solar systems—infinite in number, and observed in every part of the heavens—prevented from coming in collision with one another, or being finally congregated in one irretrievable mass?

After investigating the theory for our own satisfaction, and weighing the matter in our mind for some time, studying the properties of, and experimenting with the magnet, noting with

surprise its peculiar property of the positive, or like poles, repelling each other, while attracting the negative, or opposite poles, we came gradually to the conclusion that the fixed stars or suns, so numerous in the heavens, were all alike endowed with the same positive magnetic influence, or with some such repelling power in respect to each other; and therefore these systems would naturally repel or move away from each other, or, in other words, that while a sun and its revolving planets were kept together by mutual attraction, the same as in our solar system, all other suns, with their systems, would be prevented from coming in contact or collision by their mutual repulsion. In such an arrangement for controlling the movements of the celestial bodies, the power and wisdom of the Creator seemed to us to be manifestly displayed.

The opinion then formed, relative to the central sun theory, the writer wrote down at the time in a book which he kept for such purposes, making a rough diagram showing how the suns or systems might oscillate or change positions in respect to each other, yet never be able to come into contact; for the force of repulsion that each one had for the others would increase the nearer they approached each other, and that increased force would drive them farther away, so that it would be impossible for suns to come in contact with each other. This view of the forces governing the solar system was written out in detail, in March, 1839, some sixty years ago, when the

writer was in his teens. Since then the matter has now and then been reconsidered, but never has he found reason to change his opinion.

Some years ago the writer thought best to give to the public his view of the true meaning of the Mosaic Record of "the six days work of creation," which he had long entertained. To that end he had published, anonymously, a small pamphlet of about eight pages, mailing several hundred copies to different persons whom he judged would be interested in the subject.

The writer then being fully occupied with his manufacturing business, it was not convenient for him to elaborate or explain; so his views were stated in the form of a short proposition, the first page of which is here given. The questions and views thus submitted were important, and in some respects new; although the subject was old, and was ever being discussed by theologians and others. Over 100 copies were mailed to professors and tutors in colleges, under the impression that some, at least, would take up the questions submitted, and examine into the truth and merits of the same. But there was no response from any one. Doubtless they reasoned that, as the author was unknown, it was not worth their while to examine into the value or truth of any statements presented.

It reminded one of the wager made by an Englishman, that he could sell British sovereigns at one shilling each, and so, as the story goes, he took his place at the prominent end of London

Bridge, with twenty good sovereigns, offering to sell them for a shilling apiece, but at the end of the day had not sold any, all believing, as a matter of course, that they must be spurious.

Herewith is the first page of the pamphlet in question.

"Some of the 'Thats' concerning the universe and the creation of the world, that are probably, if not absolutely, true.

"That this universe in which we exist was created by a Being called God.

"That this Being is all-wise, good and powerful; and that no limit can be placed on any of His attributes.

"That God is from eternity, and has eternity in which to manifest His will and execute His plans.

"That in wisdom and by His power God designs and executes His plans, either directly and immediately, or by adopting means to accomplish and perfect the end.

"That God manifests design and purpose in all His works.

"That God has established general laws to govern the universe of matter, and special and particular laws for all its various orders and classes.

"That these laws, in their limit, continuance and abeyance, are subject to His will and control.

"That God may have placed a limit on the

universe, and the influence of the laws that govern it, saying, 'Thus far shalt thou go and no further.'

"That the habitable universe embraces innumerable systems, composed of suns with their revolving bodies or worlds; similar to our solar system."

"That the two forces, attraction and repulsion, control these systems.

"That while a system, the sun and its revolving bodies, are kept together by mutual attraction, the innumerable systems of the universe are prevented from coming in contact with each other by their laws of mutual repulsion.

"That this law allows the systems to oscillate, move among, or change their places in respect to each other, without danger of collision.

"That this world was not made by chance, nor formed by the operation of laws and forces uncontrolled by intelligent mind and will."

"That the times, ways and means employed by God in making the world as it now exists, are as yet hid from the knowledge of men."

104. *Opinion of Rev. E. F. Burr, D. D., LL. D., on Some Scriptural Points Named.*—Among others, a copy of the pamphlet was mailed to Rev. E. F. Burr, D. D., LL. D., author of "Stars of God," "Ecce Cælum," and many other well-known works, and here is his letter in reply, to which we call the attention of our readers, and with it, we bring this work to a close.

"LYME, CONN., Nov. 26, 1878.

"A. G. JENNINGS, ESQ.,

"Brooklyn, N. Y.

"MY DEAR SIR :

"I thank you for your pamphlet and accompanying letter.

"For some time I have stated in lectures, and elsewhere, that the whole domain of geology lies between the first and second verses of Genesis, first chapter; and that the subsequent narrative describes the several steps of the Divine movement in fitting up the earth for the human dispensation. This allows us to consider the day as being the common natural day; and I like to adhere to literal sense of Scripture as far as possible.

"As I understand your pamphlet, there are no points of importance to which I should take exception. Perhaps I ought to except the idea of repulsion, as coexisting and coextensive with attraction in the celestial economy. The idea is worth thinking about; though, if admitted, it would compel a revisal of no small part of our science.

"I ought to say that it is a great satisfaction to me to see Christian business men interesting themselves in standing up against the unbelief and lax theology of the times.

"Very truly yours,

(Signed.) "E. F. BURR."

THE END

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